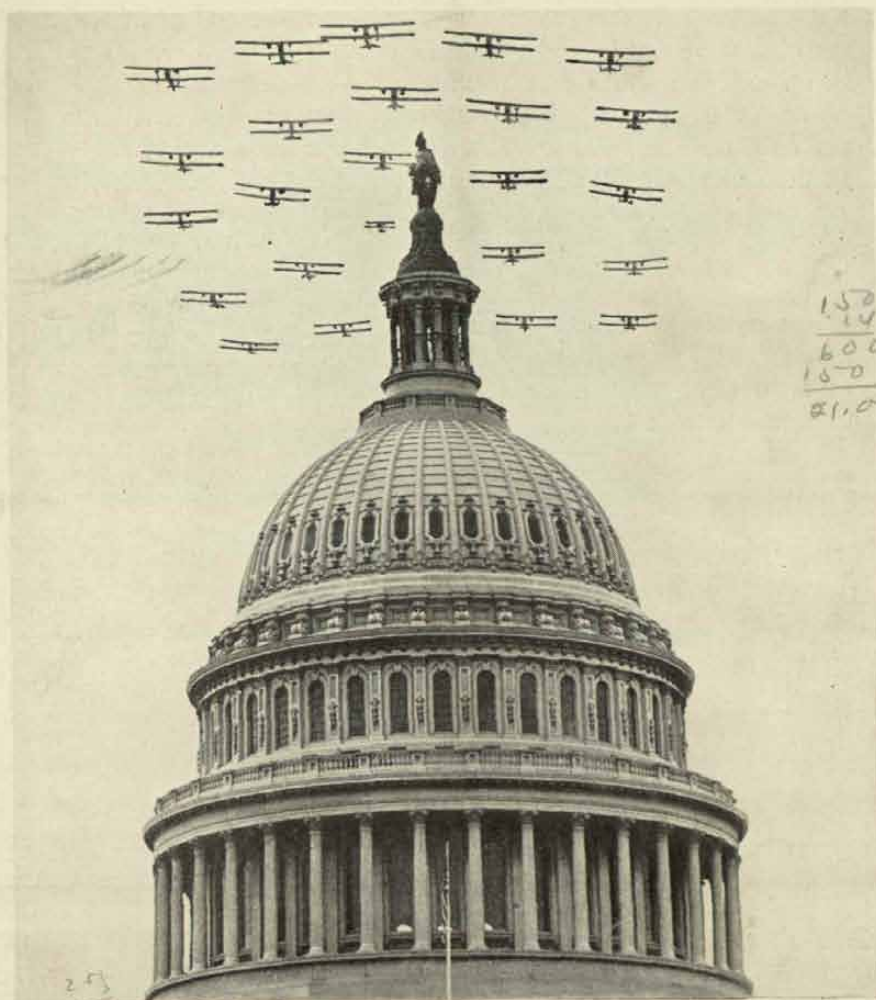


COAST ARTILLERY JOURNAL



May-June, 1933

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THE COAST ARTILLERY JOURNAL

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MAJOR S. S. Giffin, C.A.C., Editor

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Notes of the Coast Artillery Association



Major E. E. Bennett

AT THIS time it is the duty and pleasure of the retiring editor of the COAST ARTILLERY JOURNAL to announce the name of his successor. Hereafter, the JOURNAL will be in the capable hands of Major E. E. Bennett, Coast Artillery Corps, whose qualifications for the detail are of the highest order.

Readers of the COAST ARTILLERY JOURNAL will be interested to learn something of Major Bennett's previous life and career. The first point in his favor is that he was born in the State of Maryland. Citizens of this state have always been noted for their independence in thought and action—a valuable quality (we believe) in any editor. He attended St. John's College at Annapolis, Maryland, graduating in 1907. After a short period in civil life he entered the military service in 1909 as a second lieutenant in the Coast Artillery Corps where he has served ever since.

Major Bennett reached the temporary grade of major during the war while he was on duty as an instructor in the Officers Training Camps at Fort Monroe. In 1918 he was assigned to the 70th Artillery (8-inch hows.) and went overseas with this outfit. He served at the front although the 70th never was in action as a unit. Following the Armistice he was detailed Assistant Inspector General, District of Paris, and afterwards was with the Army of Occupation at Coblenz, remaining abroad nearly three years altogether.

Upon his return to the United States he served at several Coast Artillery posts. He graduated from the Advanced Course, Coast Artillery School, in 1924 and the following year completed the Command and General Staff School at Fort Leavenworth. He is a member of the General Staff Corps Eligible List.

Many reserve officers of the Third Corps Area will

remember Major Bennett as the Executive Officer (for Reserves) of the Third Coast Artillery District. He was very much in evidence at all training camps held at Fort Monroe during his duty on the District Staff. He was also editor of *The Bulletin*, a mimeographed publication issued by the Third Coast Artillery District for distribution among the Reserves. *The Bulletin* under Major Bennett was undoubtedly the best publication of its kind and served as a bible to the reserve officer, especially those located at a distance from their headquarters. His able editing of *The Bulletin* had much to do with his selection as the editor of the COAST ARTILLERY JOURNAL.

Recently Major Bennett served a two-year tour in the Philippines, returning in December for duty in the Chief's office. He spent several months here where he became familiar with the routine procedure of this office and enters upon his new duties with a wide experience and first hand knowledge of the Coast Artillery Corps. All his service he has been a Coast Artillery officer.

Recently the President of the Association stated that the editor of the JOURNAL should possess one quality which he considered as important as any other. He said that it was his belief that the editor should be an officer of a type *persona grata* to the National Guard and Organized Reserve. By this he meant a regular officer who had a sympathetic interest in National Guard and Reserve problems, who understood their attitude on various questions and brought a human understanding and respect for their endeavors and accomplishments. It is more than probable that he had Major Bennett in mind for the detail when he made this statement because the new editor of the JOURNAL has this quality to a high degree. This is as it should be because the principal mission of the JOURNAL as the organ of the Association is to promote that fraternity in arms which is so important in military endeavor.

It is with a sincere feeling of satisfaction that we turn over our chair to a new editor of whom we approve so wholeheartedly. The duties of the editor are more than are apparent from the pages of the JOURNAL itself. He should be a promoter, a business executive, a collection agency, a prognosticator of the future. He should be able at times to walk on eggs without cracking a shell. He is the confidant and friend at court of everyone who writes him. He often breaks the news that the Mrs. is expecting a new arrival and "can't be moved." He hears from so and so that he is so far in debt that he can't move without the sheriff's permission. He is expected to know the length of the *Monitor*.

We wish Major Bennett all the luck there is. Any editor of the COAST ARTILLERY JOURNAL needs it. We ask for him the continued support of the members. With your support he will not fail.

THE UNITED STATES COAST ARTILLERY ASSOCIATION



"The purpose of the Association shall be to promote the efficiency of the Coast Artillery Corps by maintaining its standards and traditions, by disseminating professional knowledge, by inspiring greater effort towards the improvement of materiel and methods of training, and by fostering mutual understanding, respect and cooperation among all arms, branches and components of the Regular Army, National Guard, Organized Reserve and Reserve Officers' Training Corps."



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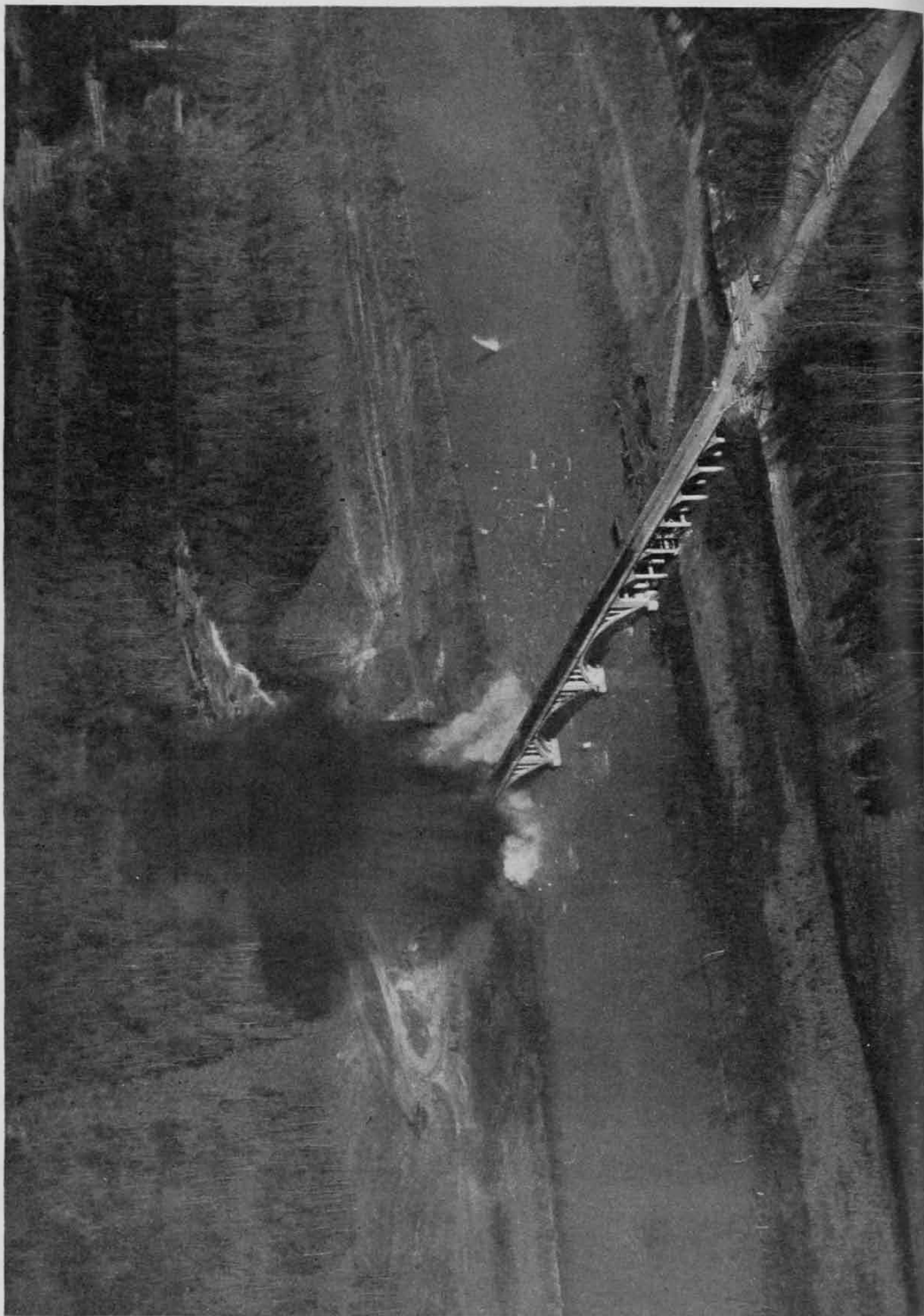
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THE PEELE RIVER BRIDGE UNDER BOMBARDMENT FROM THE AIR

Bombardment Aviation

By 1ST Lieutenant Charles H. Howard, Air Corps

EDITOR'S NOTE—The writer of this article wishes it to be understood that the ideas expressed do not rigidly follow in all respects the accepted doctrine and teachings of the Air Corps. It does present some interesting features which are worthy of serious consideration. The speeds and ceiling of bombers may be excessive, considering only the attainments of planes in service today, but who will dare say that they will not be equalled or exceeded within a comparatively short time. The defense must be prepared to meet this change and in fact should anticipate it. This will mean a revision of doctrines and tactical principles, questions of vital importance to the antiaircraft artilleryman.

ALTHOUGH early conceived as one of the prime uses of the airplane, bombardment aviation as such actually dates from the World War. The Italians in 1911 in their campaigns in Northern Africa and later the Spaniards in their Moroccan campaigns employed aerial bombs as a means to victory. However, these sporadic raids even though their primary object was the dropping of bombs might be more properly classified as a function of our so-called "attack" aviation. So we must look to the fundamental principles of bombardment aviation as conceived and used in the World War as a basis for our present teachings. Any conception of bombardment aviation must begin with a recognition of the fact that it is to be used for the destruction of material objectives. This destruction will have, in addition to physical damage inflicted, a highly demoralizing effect on personnel and will greatly weaken the enemy's will to war. But it should be constantly kept in mind that it is used against materiel and not against personnel.

Until the past year bombardment seems to have lagged behind the other classes of aviation in comparative improvement. The speed of the pursuit plane has increased from a war-time maximum of 130 miles per hour to over 200 miles per hour with a great increase in fire power and ceiling. Attack aviation, an outgrowth of the World War, has kept pace with observation in speed and armament and recently appeared on the scene with a well designed model possessing extremely high speed and capable of unprecedented fire power.

On the other hand we find the speed of bombardment remaining for years in the vicinity of 100 miles per hour; likewise the bomb load has remained at some 2000 pounds except for one particular design, the Curtiss Condor, which successfully handles a 4000 pound load. The bombardment airplane has been developed on the principle that it be capable of carrying one bomb which is effective against any type of bombardment target. Study and experiment indicate that the 2000 pound bomb meets this requirement and it is believed to be sound reasoning to develop an airplane carrying this load rather than a larger airplane carrying two such bombs. This logic is further strengthened by the impositions of international agreement limiting the tonnage of battleships, so we may conclude that the 2000 pound bomb, or its equivalent weight in smaller bombs, will be the standard requirement for bombardment planes.

The Air Corps is at present almost entirely equipped with the Keystone bomber, this particular ship being a gradual development over a period of years and is, in common with bomber design of the past few years, a two motored biplane powered with air cooled engines of 575 horse power each. It has a high speed of some 114 miles per hour carrying a 2000 pound bomb and combat crew. In comparison we find the Martin under the official type number of NBS 1 of 1922 doing approximately 100 miles per hour with an 1800 pound load thus bearing out the contention of slow bombardment progress.

However, during the past year several manufacturers, including Douglas, Boeing and Martin, have produced designs which give rise to new dreams of bombardment prowess. Service models of the Boeing have been delivered and are giving a good account of themselves showing as they do, a remarkably high speed with a 2000 pound bomb load. This ship marked the entrance into bombardment aviation of the internally braced monoplane. It is of the low wing type powered with two air cooled engines which, due to the extreme thickness of the single wing, allows a well stream-lined installation. When in flight the landing gear is withdrawn into the wings, resulting in a very trim appearance and corresponding low head resistance. The bombs, contrary to prevailing practice, are carried on external racks underneath the wings and have a negligible effect on the speed. The Douglas bomber, also a monoplane but of the gull wing type, powered with two 600 horse power liquid cooled engines and classified as a light bomber, carries a bomb load of 1250 pounds. The ship being produced by the Martin Company has recently been undergoing tests and at present accurate figures on its performance are not available. It too is a monoplane but of the so-called midwing type with a fuselage large in comparison to the slender cylindrical bodies of the Boeing and Douglas, thus allowing the bombs to be carried internally.

With the lag in bombing plane development there has been a corresponding lag in the development of bomb sights but as is the case with the airplanes, the next year or so will see marked improvement in this vital accessory. Since a bomb,—which we think of as dropped,—is more properly projected, with an initial velocity of that of the plane, it must, after the manner of a projectile, be aimed, and so aimed possesses for any combination of ground speed, alti-

tude, air speed and type of bomb, a trajectory known with the same certainty as that of an artillery shell. However, with the radical difference that the shell has a high initial velocity of 2700 feet per second compared, for example, with the 200 feet per second of the bomb's initial velocity when projected from an airplane travelling at 136 miles per hour. The shell is fired from a gun with a constant or known charge and the range is controlled by elevation of the gun. The range of the bomb cannot be so controlled but for any given combination of the variables mentioned above, we can place the airplane at the proper point in the approach to the target from which the bomb will have the correct range to reach its objective. It is not to be expected that the same exact conditions exist on any two approaches so that each successive shot entails a new determination of range or more properly, range angle. This is the function of the bomb sight. This device has, in the progress of bombing technique, developed from two nails set in the side of the fuselage, from which the pilot or bomber deduced the proper angle of release, to complicated mechanical computers, which by their very intricacy defeated their purpose. Considering the number of variables, altitude, air speed, ground speed, type of bomb and wind, both velocity and direction, a machine which will account for all, must be somewhat complicated. Simply stated the function of any bomb sight is to determine under a given set of conditions, the proper angle at which to release the bomb. Among the many ways in which this may be accomplished is mentioned the simplest type consisting of an angle setting device supported so as to hang vertically, whose adjustments are made from a set of previously calculated tables. With such a device the bomber's problem becomes solely one of guiding the pilot on a direct line to the target and waiting until the objective lines up with the sight at which instant the bomb release handle is pulled. At least two other methods of setting this "range angle" are in use. Both these methods depend on mechanical means to arrive at the result, and both base this result on conditions existing immediately before the release instant or on through that instant. They are known respectively, as the "timing" and the "synchronous" methods. The first consists essentially of holding a sight line on the objective by means of a crank which moves a sighting wire rearward through a predetermined period of time based on the time of fall of the bomb for that altitude. This period is measured by means of a clock work whose dial is calibrated in thousands of feet altitude rather than seconds and which is set by the bomber from his altimeter reading. As the bomber cranks the sight to keep his sighting wire in line with a fixed sighting wire, or eye piece and the target, a set of gears causes another, or range angle wire, to advance. To obviate the difficulty of timing for a period equal to the falling time of the bomb, the range angle wire is arranged to move forward at three times the speed of the front sighting or timing wire and the clock is set to indicate one-third of the actual falling time of the bomb. Completion of the timing period

is indicated by the appearance, in a small window within the bomber's vision, of a white marker which the second hand of the clock work carries on its round. The position of the rear wire indicates the proper range angle for the given conditions. As soon as "timing" is completed the bomber turns his entire attention to solving the drift angle and keeping the pilot on the proper course by use of interphone or pilot directing systems. There is normally an appreciable time interval averaging around four seconds, between completion of the timing process and the arrival of the objective in line with the top sighting point and the bottom or range angle wire where the bomb release handle is pulled. If the above has been correctly done we may expect a "bull's eye" which on the bombing range means a hit within a circle of 100 feet radius. It is highly important that the air speed and altitude remain constant from completion of timing to point of release. When it is realized that a variation of one mile per hour in air speed, between the timing and dropping processes, causes an error of twenty-six feet on the ground from a 5000 foot altitude, the importance of good piloting may be more fully appreciated. Although this may appear difficult to the uninitiated it is here stated that pilots are able to hold steady courses over long periods in which the hand of the air speed indicator does not vary its own width on the dial. A sight of the type just described is classed as an open type as against others possessing optical systems. The open type sight has a disadvantage of requiring the operator to move his eye with the progress of the ship toward the target. This may result in errors of alignment, both laterally and in the direction of motion. The optical sight may be so arranged that the eye piece remains stationary while the objective is picked up and followed through a system of prisms which are capable of angular variation. This is normally advantageous but may result in difficulty in picking up the target for night bombing.

Only the gist of the sighting operation has been mentioned above. Errors are introduced due to the so-called personal error or time lag of the individual bomber, the variations in trajectory of the different type bombs and the effect of bombing cross wind. Happily, the variations and errors in bombing operations are to a large extent compensating rather than cumulative. In straight up or down wind bombing, the path of the airplane is a line which projected would go directly through the target. In bombing cross wind the airplane must be so headed as to compensate for drift. If we drop the bomb after a cross wind approach in which the projection of the airplane's path intersects the target we would find that our bomb would have been carried a distance to one side depending on the amount of drift. To compensate for this we turn this sighting wire to such an angle to the fore and aft line of the fuselage as to cause the target to apparently travel along the sighting wire. The turning of the sight on its axis causes the top sighting point to offset itself in direction and amount to compensate for the drift component, thus causing the pilot

to be guided in an offset approach. The difficulty of cross wind bombing is experienced with all types of sights and is one of the most difficult corrections, both on the part of the bomber and of the pilot who has to approach the target literally sidewise. Similar compensations are required in bombing a moving target. To the inexperienced, cross wind bombing is difficult but once the bomber has learned to trust his sight, this trouble largely disappears. Typical of the "timing" methods of sighting as previously described, are the type D-1 and D-4 bomb sights now used by the Air Corps.

In the synchronous type of sight we begin with a fundamental requirement of a constant speed motor which is connected to our range angle arm through a manually variable speed system. The first operation in a sight of this type is to set the various dials corresponding to type of bomb, altitude and air speed, thus setting up a range angle for the given conditions. With these settings made we are ready to approach the target. As the target comes into the sight line or field of view the gears or the driving motor are engaged by the bomber. If all our settings are correct and there is no wind we may find that the sighting arm or optical system in its angular travel keeps constantly on the objective. As conditions of air speed or wind vary it is necessary for us to change the angular velocity of the sighting arm. To do this we do not change the speed of our driving motor but rather the rate at which it is driving the sighting arm backward. This adjustment causes corrections in the range angle which we established by our original settings and readjusts the speed of the sighting arm to correspond to the changed conditions. As this arm travels rearward it will arrive at the same angle as the range arm. This is the proper point of release and may be indicated by the flashing of a lamp as the two arms coincide or in a more advanced form may electrically release the bomb. One advantage of this type is that if the bomber has properly synchronized his sight and conditions remain constant, he need not even see his target at the point of release. There are numerous occasions when a cloud or possibly a smoke screen may obscure the target at the critical instant. In the above case that is of no concern. What has been said of the first sight as to possible errors and cross wind approaches applies also to this sight. In fact, the final result of a bombing operation depends on the closest cooperation and skill on the part of both pilot and bomber.

Although the D-1 and D-4 first mentioned above have been the standard equipment of the Air Corps for many years they have not enjoyed the popularity or appreciation by bombardment personnel that recent bombing results would indicate they deserve. In keeping with the steadily increasing efficiency and high degree of training through which the Air Corps has gone in the past few years are the constantly increasing scores by which the annual Air Corps bombing matches at Langley Field are won. These bear testimony both to the increasing skill, on the part of the personnel and to the increased effectiveness pos-

sible when the full capabilities of the sight and the personnel are exploited. The bombardment qualification course at present consists of dropping five bombs up wind and five bombs cross wind from altitudes of 5000 feet and 8000 feet. The target in both cases is a circle of 100 foot radius. The penalty for shots outside this range is one point for each ten feet from there on. Thus the possible score is 2000 points. The score of the winning team for the year 1932 was, coincidentally, 1932 points. It will be seen that very few of these bombs missed the bull's eye. A revision of this bombardment course is now being made with an idea both to increasing its effectiveness in training and to more nearly indicate the high degree of accuracy possible.

With the acquisition in the near future of highly improved sights it is confidently expected that still more accurate results will be accomplished. The



View of Pedee River bridge showing extent of damage after a direct hit by a 1100 pound bomb.

sighting methods described above all require a certain period of straight and level flight for the highest degree of accuracy and it is during this period that the plane is most subject to antiaircraft fire, both because of the straight level flight and that it occurs in the normal antiaircraft area. It is this period which antiaircraft look forward to in the fulfillment of its mission. This time normally overlaps the flight time of the antiaircraft shell.

For this reason it is believed that thought should be given to a bombing method based on accurate ground speed observations made from five to ten minutes before approaching the defended target from which range angles are set. The proper range angle having been obtained, the plane approaches the target in free curvilinear flight leveling off an instant to reestablish the flight conditions under which our range angle was set, drops the bomb and gets away. Of course any bomb sight may be calibrated in ground speed but it is believed that an instrument designed to give both this and drift should be used to provide data for automatic setting up of the range angle for the previously determined conditions. It may be said that our modern bomb sight accomplishes just this but when we consider that it is done under the most hazardous conditions any means which will obviate straight flight in the antiaircraft fire zone should be considered. Even from simulated approaches to an antiaircraft area the time taken to bring the plane on the target line and adjust the sight gives too long a period of straight flight for safety.

In discussing bombs and bomb sights some very interesting figures come to light as the "range" and the velocity of the bombs at impact. Tables giving the so-called terminal velocity are furnished and show for each type of bomb its TV from which the proper corrections and settings are made on the sight. These run from 775 feet per second for the now obsolete 25 pound Mark 1 to 1225 for the 300 and 600 pound bombs up to a maximum of 1800 feet per second for the 2000 pounder. Tables prepared by the Ordnance Department give the terminal velocity and impact velocity from various altitudes with great accuracy. That impact velocity is almost totally dependent on the altitude from which the bomb is dropped rather than from the speed of the airplane is shown in these figures given for ground speed velocity at 60 and 120 miles per hour at 8,000 and 16,000 feet. They are 661 feet and 672 feet, respectively, from 8,000 feet at the two airplane speeds and 861 and 865 per second from 16,000 feet. Noticeable is this small variation in impact velocity to doubling the airplane speed. This difference of course grows smaller as the altitude is increased. The maximum velocity tabulated is 921 feet per second for a bomb dropped 20,000 feet. Another interesting table in connection with the fall of bombs is that of time of flight. This time of flight is not as interesting in itself as in its bearing on the ranges at varying speeds. It gives a better picture of the problem confronting those who must prepare defense against bombing. As examples of falling times of present day bombing speeds of 100 miles per hour from varying altitudes the following figures are quoted:

<i>Altitude, Feet</i>	<i>Horizontal Range to Target in Feet</i>	<i>Time of Flight in Seconds</i>
8,000	3,144	23.01
10,000	3,498	25.86
15,000	4,244	32.07
18,000	4,629	35.39

Now increasing this speed to 160 miles per hour, which speed is exceeded by modern bombardment aircraft, we have the following comparisons:

<i>Altitude, Feet</i>	<i>Horizontal Range to Target in Feet</i>	<i>Time of Flight in Seconds</i>
8,000	4,985	23.08
10,000	5,546	25.95
15,000	6,734	32.14
18,000	7,344	35.49

Increasing the speed of a bomber at release instant to 200 miles per hour increases the range to something over 8,000 feet when dropped from a 15,000 foot altitude.

It is at speeds like this that the bomb becomes almost a projectile in range and carrying as it does approximately fifty per cent of its weight in high explosives is more destructive than any artillery shell of the same weight.

The bombs themselves have gone through an extensive process of development. Beginning in the War as reworked artillery shells, they have become

highly specialized in design. Early tendencies were toward pure stream line shapes whose stabilizing fins made them look like a model airship. This shape, while excellent aerodynamically, presents serious problems in production and present trend is toward cylindrical bombs which are not only easier to manufacture but apparently lose little or nothing in accuracy of trajectory.

Although there are a number of special types of bombs, including smoke, gas, incendiary and fragmentation, the demolition bomb remains the most important type for heavy bombardment. As bombardment operates against material targets the blast effect of the demolition bomb, rather than fragmentation of the bomb case, is of primary importance. At close range the blast effect is tremendous. Their destructive effect is enhanced when provided with fuses giving a fraction of a second delay allowing penetration below the surface either of the ground or water. This penetration may be considered effective against masonry works but its value against heavy armor plate is doubtful since the blast effect against the hull of a ship caused by a bomb exploding close along side should result in more serious damage than a direct hit. While development is continuing on bomb types it is quite probable that the weight divisions into which demolition bombs are now segregated will be continued. This series begins with a 100 pound bomb and continues through 300, 600, 1,100 and 2,000 pound sizes. The explosive load of all these types may be roughly considered, as noted previously, as fifty per cent of the total weight of the bomb.

With the destructive effect of high explosive bombs against all types of target admitted we come to the ultimate mission of the bombardment airplane, that is, simply, putting the bombs on the assigned target. Pitted against the bombardment crew we find the pursuit airplane and antiaircraft artillery.

Bombardment may feel flattered that such energies are bent on keeping it from completing its mission and may expect every resource of these two arms to be directed toward this end. A high degree of courage will be required in bombardment personnel to enable them to doggedly proceed to their objective in spite of these hazards. And to this may be added the discomforts of intense cold in high altitude flying where the use of oxygen is necessary. Just a word is mentioned concerning this last hazard. Wars are glibly planned at altitudes ranging up to 30,000 feet, principally by those who have never been there. These high altitudes necessitate the use of oxygen, warm bulky clothing and with the accompanying intense cold may be found to have such a serious effect on the determination of the crew to carry on plus the accompanying slowing up of the mental processes that we will find bombardment accepting the problematical dangers of lower flying altitudes as preferable to the intense physical discomforts of extremely high altitude conditions. Present bombardment airplanes make little provision for crew comfort over long periods of extreme cold resulting from flying at high altitudes.

In speaking of defense against hostile pursuit we find it necessarily in a passive role so far as offense is concerned. Even though retaliative attack were possible the mission is of sole importance and no distraction however attractive, and we may add, dangerous, will be allowed to turn the bomber from his objective. He must anticipate, plan for and ward off pursuit attack. To this end every bombardment airplane is provided with machine gun defense. These are flexibly mounted so as to enable the gunners to cover as large a sector as possible. This must include rear, front and lateral areas both above and below. Thus we find the conventional bombing airplane designed to carry a gunner in the nose and two gunners in the rear of the fuselage. One of the rear gunners covers the blind areas immediately below and to the rear by means of a "tunnel gun" firing through the floor of the fuselage. It must be noted that bombardment defense, against hostile pursuit comes from the mutual support of planes in formation. The placing of gunners and their training must be such as to leave no avenue of approach uncovered. Formations too, are planned to give the maximum possible area of fire to the gunners without interference from other ships in the squadron. In addition to the machine gun fire possible from the bombing formation there is the possibility of maneuvering the squadrons or flights in such a manner as to confuse the aim of the pursuit pilot. However, it is felt that primarily, a bombardment defensive formation should be so arranged as to exploit the delivery of concentrated, aimed, supporting fire power which is inherently superior to that which may be brought against it, rather than by placing too much dependence upon maneuvering for defense. In firing, the pursuit pilot aims the whole airplane and in diving at speeds from 200 to 300 miles per hour this aiming involves moving the whole airplane to a changing line of sight in a very few seconds. In spite of the fact that bombardment airplanes are generally thought of as unwieldy and incapable of quick maneuvers, it is well known that a highly trained squadron can immeasurably increase the difficulties of pursuit attack by changes in direction and speed. Furthermore it is found that this movement of the bombardment gunner's firing platform does not interfere with his precision of fire to the extent that might be anticipated. This maneuvering should not be contemplated as the normal manner of meeting pursuit attack. In the majority of cases the pressing home of the bombardment attack will preclude such delay and bombardment should learn to rely solely upon its superior fire power for defense.

The above arguments apply in general to the diving attack by pursuit. Other attacks may be expected, among them long range harassment with large caliber guns from a position to the rear of a formation, this being, due to the presence of control surfaces, the blindest spot about most airplanes. And again we find the possibility of flanking fire from newly developed two place pursuit.

In answer to the long distance high caliber attack, bombardment will probably provide sufficient weapons

of a similar type to be on equal footing. Due to weight the amount of large caliber ammunition that pursuit can carry is limited, which limitation will have less effect in the case of the bomber so the question of whether the same amount of lead in smaller bullets is equal or more effective is still open to argument. As to the flanking attack, bombardment planes begin this on a parity with pursuit.

Some suggest that the new high speed bombers may avoid interception and resulting combat by equal or superior speed. While this might be possible for this particular period when bombardment suddenly finds itself in possession of pursuit speed it may assuredly be expected that intensive pursuit development will



A close-up of a Curtiss Condor bomber and a 2000 pound bomb. This plane is a part of the 11th Bombardment Squadron now under command of the author.

give it an advantage in speed. However, it should be noted that a thirty mile superiority of speed over a 100 mile an hour bomber is a far different proposition than a similar superiority over a 200 mile per hour bomber both in difficulty of attack and in the time required to complete a mission. Also this high pursuit speed presents an additional if unintentional danger to bombardment. From the annals of the World War we find instances of those heroes who gave their all by diving into the enemy. Possibly this might have been accidental. With a long period required for small wing surface high speed ships to flatten out of a dive or change direction we may find some pursuit pilot made heroic by a slight error of judgment in pulling out of his dive. It is trusted that the error will occur against an enemy and not among one's friends.

Bombardment, in the development of its defensive tactics considers fully all means by which hostile pursuit may deliver effective attacks against bombardment formations. The development of defensive tactics considers fully all possible means, and at this time has developed tactics which will, in theory, limit largely the effectiveness of pursuit opposition.

While on the subject of pursuit attack there is one important consideration which weighs heavily in their favor. That is the attitude of the average peace time trained pursuit pilot who argues that as he fires and is fired upon only a slight portion of his anatomy is exposed and he confidently expects his motor to absorb

ninety-nine percent of the hits intended for his body. True, his motor may be caused to fail but that means merely a forced landing and not necessarily a personal injury. It is believed that this is a true reaction and the proper answer is armor protection for the bombardment gunner. This however is controversial, it being a well known fact that during the World War pursuit pilots had a high degree of respect for a closely flown and well defended bombardment formation. In asking for gunner protection it is intended that only the most vital portions of the gunner's body be covered assuming that he will be firing on the man who is firing at him and thus is placed on somewhat equal grounds. Designers and tacticians will cry out against the increased weight but it is believed that the man who swings a gun against a diving pursuit pilot knowing that bullets may spatter around or hit a portion of his person not vital, will stick with a greater determination than the man who when seeing a hole ripped in his nacelle may expect the next one to puncture him. Inquiry among pilots of the World War reveals a liberal use of stove lids for a partial fulfillment of the need.

And after these slight suggestions for the preservation of the bomber we come to another element of defense. That is protective pursuit. Common practice during the War and present day teaching involves the escort of bombardment through the front line danger of the enemy pursuit, leaving them at the limit of their sector or gas supply and possibly picking them up on the return for further escort back to the airdrome. This has two serious faults. One, that due to small gas capacity the pursuit protection exists only during a fractional part of the bombardment mission. Enemy attacks would well be delayed sufficiently to avoid our own pursuit. Secondly, pursuit so employed is a defense force and this role in an essentially offense weapon constitutes a perversion of this attribute even though in course of such employment it encounters the enemy.

The considerations resulting in the above paragraph are based on the present day pursuit airplane which has those limitations. It is believed that the major consideration in aerial warfare is the driving home of the bombardment attack and if pursuit is to fulfill its protective role in such tactics it must develop airplanes of high speed and fire power capable of staying with a bombardment formation throughout its entire mission. However, it is still believed that bombardment should be made self-supporting. To this end nacelle arrangements such as are found in the Curtiss Condor are desirable. In this plane a gunner is carried in a nacelle behind each motor from where he commands an arc of fire through almost the whole rear hemisphere, being blocked on one side by the fuselage. An additional gunner may be had in the fuselage as in conventional types giving support to either side. This arrangement carried out in the new monoplane bombers, which have no top wing to limit either the pilot's or gunner's vision in the upper hemisphere, would provide a gunnery defense that the most foolhardy pursuit pilot would hesitate to at-

tack. The argument against loss of speed due to increased weight and open cockpits will be met by more efficient airplanes and hooded or closed gun turrets. This with a total of four gunners and twin mounts would make possible a total of eight guns. Possibly two of these could be replaced by a fifty caliber gun on a semi-flexible mount allowing slower adjustment but more precise fire for repelling rear strafing operations. Thus each bomber would be a veritable air battleplane. Perhaps too much so. But from it we can readily proceed to a similar idea which has been suggested and met with some favor. That is the provision of each bombardment squadron with a number of real flying battleplanes, carrying no bombs but many gunners and with a performance equalling, but preferably superior to that of the planes which it accompanies. It is believed that any scheme which will release pursuit from a protective role should be given fullest consideration, even to the development of a new type of pursuit plane as noted above.

Having disposed of the pursuit obstacle we come to that of antiaircraft. Considered relatively unimportant in the early part of the War it soon became a real menace and with the immense strides of post-war development takes its place as a weapon which must be considered seriously in developing bombardment defensive tactics. The newer guns have both a high degree of mobility as well as increased caliber, range and fire power. Searchlights of a billion candlepower are designed to seek out with their slender rays any aircraft up to altitudes around 20,000 feet while mechanical aids accurately point the guns, set the fuse and blaze away at rates much in excess of the World War time antiaircraft guns. In the development of bombardment tactics the antiaircraft threat has received fullest consideration.

For this problem bombardment may rely on high altitude, rapid changes of direction, loosely flown formations and routing to avoid known antiaircraft areas other than the objective. Antiaircraft artillery having achieved some success in training against the present day 100 mile per hour bomber will find themselves up against a decidedly different problem with the newer designs possessing a speed of some 200 miles per hour and a service ceiling of approximately 20,000 feet. Referring for a moment to our range tables we find that the 200 mile an hour bomber, moving as it does almost 6,000 yards per minute, increases the range over the 100 mile per hour bomb released at 15,000 feet from 4,244 feet to 8,372 feet. Taking into consideration this new high speed factor the graphical representation of the antiaircraft installation presents an entirely new picture. In the flight time of a projectile to 17,000 feet the plane travels 6,000 feet. A rather long lead for such a small target. For the defense of a given area both the guns and searchlights must be moved outward from the defended area. In other words the decisive zone becomes four times as wide as present for a doubling of bombardment speed. This means more guns or a decidedly less effective fire power in the concentration possible on any one area. The same consideration given to land antiaircraft

batteries is being given to anti-aircraft defense of naval craft. It is recognized that while possibly more guns are grouped per unit area in the case of the main body of a battle fleet the problem confronting them of bringing all guns to bear is adversely influenced by the masking of fire by portions of the ship and the more difficult problem of fire control from a moving platform.

Air tactics at the present time contemplate either the avoidance of known anti-aircraft areas or flight at high altitudes. When such fire is unavoidable by the above means probably the best solution for putting a maximum number of ships through to the objective lies in the dispersion of the bombardment formations, both by squadrons and within the squadrons, sufficient distance being maintained between the ships so that any single burst will not cripple more than one. In addition to the dispersion the area under fire will be crossed in curvilinear flight, changing course, speed and altitude or a combination of these during an anti-aircraft attack. The proposition of opening up to any considerable interval might be open to the criticism that good coordination by the pursuit and anti-aircraft might result in opening up a formation by heavy concentration of anti-aircraft fire only to have it suddenly cease with bombardment subjected to a detail attack by enemy pursuit awaiting this opportunity. The possibility of carrying out such a high degree of coordination in practice is remote, but with the rapid strides made in aircraft radio such a possibility should be considered but not expected except in defense of cities or other objectives to which pursuit has been assigned for close defense as occurred during the defense of London in the World War. The possibility of maneuvering bombardment by flights rather than by individual planes should give practically the same degree of maneuverability with the advantage of three ship protection from pursuit. As to night bombardment it is generally conceded that this should be carried on by individual airplanes attacking at frequent intervals and at different altitudes. Present tactics contemplate that these attacks will be preceded by low flying attack aviation which will endeavor by bombs and machine gun fire to put the searchlights out of action.

Due to the problem of visibility there are very few precision targets which may be successfully bombed at night. Area bombing will be the normal employment. Moonlight nights may give sufficient visibility to accurately bomb some definite point, but this should be considered the exception rather than the rule. Bridges, objectives adjacent to well defined water areas, lighted factories or steel mills may be precisely bombed. Areas in which the blackness of a very dark night prevails will present a real problem to a bomber, particularly if there is a ground haze. Under these circumstances it is easy to imagine a large number of bombs dropping wide of the objective, especially if the sector is one not entirely familiar to the flying personnel. By this same token a clever enemy might lead a bombardment attack astray by a well conceived deception, camouflage or intentional exposure of barren area.

The proposition of having the objective lighted by flares dropped by attack aviation or of delayed opening parachute flares dropped by the bomber itself has been advanced. Navigation at low altitudes being, at best, a difficult job it is highly possible that attack might become lost or by lighting the wrong areas waste the bombs on the open prairie. A theoretically excellent method of bombing obscure objectives by night would be to send over in the late daylight hours attack aviation to approach the objective and drop a timed bomb which would ignite and burn with a characteristic light a prescribed number of hours later. The bombing attack will be scheduled to occur at that time and once the bombs started falling in the chosen area it should be simple for following ships to pound the target to pieces. In case the objective were such that the indicating bomb might be totally obscured either by the nature of the target itself or having been discovered and disposed of by the enemy, it would be possible to have this spotting ship drop two bombs of this type in succession a distance away from the objective, thus establishing a flight line for the attack to follow. At the time of dropping a series of photographs showing not only the impact point of the indicating bombs, but a mosaic strip from these indicating bombs to the objective would be taken by the airplane. A small powder charge would serve to accurately identify by smoke puff their point of impact. These pictures developed as a strip map would enable accurate scaling of the distance between the marking bombs and the objective. These bombs bursting into distinctive colored flames at the time laid out for the approach of the bombardment attack would establish not only the proper flight line but flight time and, correspondingly, ground speed between these points and by means of an automatic delay on the bomb sight in the case of electric releasing racks or by means of a stop watch and calculated data, delay the dropping to a definite time beyond the indicating flare. To prevent an alert enemy from stimulating such bombs they should be so designed as to burn with various color combinations known only to the bombers. Some such scheme is proposed since pilots still get lost in the daytime and because it is believed that every



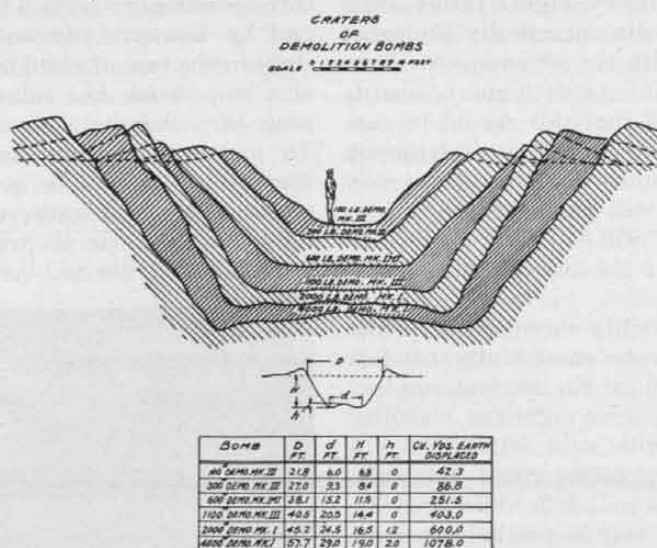
Crater made in the granite rock of Wichita Range by explosion of 2,000 pound bomb. Dimensions: 12 feet deep by 31 feet in diameter. Bomb dropped from 15,000 ft. altitude.

pilot will admit that searching out a definite point or area on a black night is almost an impossibility. No one will maintain that every bomb dropped during the World War hit its target. The inaccuracies of this period were due both to the absence of suitable sights and the lack of means to illuminate the target. This factor, however, did not totally lose the value of night bombardment for as a morale lowering factor and consideration of the number of machines and troops diverted from the front still rendered night bombing effective. The thought rises that in a given area heavily defended by anti-aircraft it is possible that a wandering aviator might be brought to his target or at least some target, by overzealous anti-aircraft who, turning their lights on to catch the marauder, may direct him to the objective or "an objective." Notwithstanding the fact the anti-aircraft personnel are trained to withhold their lights until the ships are within range it will take precise judgment and knowledge of visibility to make a decision whether to attempt to bring him down or let him waste his bombs on the open country. The above discussion pertaining to locating accurately and bombing effectively at night the objective has been set forth to indicate that the problem is fully appreciated by bombardment aviation and that steps are being taken

to eliminate what might possibly be considered a limitation to the effectiveness of bombardment aviation.

The above discussion of bombardment and its problems may contain statements at variance with current teachings and possibly some unorthodox conceptions. It is not intended to make or enter into controversy with any given school of thought, but rather to suggest some of the possibilities and the difficulties of the arm with the idea of full exploitation of the first and elimination of or minimizing the latter. Championship of any particular arm or service is liable to lead one to consider only his own problems from a favorable angle, but we must bear in mind that any weapon development of our own may possibly be that of the enemy. The powers and limitations of every weapon should be well understood and our studies and training bring out not only the strength of one particular arm but to learn also its weaknesses and the strength of other arms.

For in the final analysis it is the training, determination and courage of the fighting personnel that determine the success or failure of any mission. We look forward with full confidence that our small army will, with those qualities, make full and necessary use of the agencies provided.



Divisional Organization

By Major General Fox Conner, U. S. Army

ALTHOUGH organization must be considered in terms of millions, the division remains the all important tactical unit. The most advantageous organization of the division is, therefore, always a live issue. Since 1920, I have favored the so-called small division, and one organized entirely differently than was the A.E.F. Division. During the past few years several criticisms of the organization of the A.E.F. Division have appeared. But these criticisms have not been directed toward the suitability of the A.E.F. organization for the future. They have rather been directed at the A.E.F. Division as a suitable unit for use during our participation in the World War. Since it is a matter of common knowledge that the A.E.F. Division successfully met the conditions under which it was used, the criticisms which have been made are weakened. The critics have further weakened their case by failing to give the true and complete story of the origin of the A.E.F. Division. Whatever the effect on mob psychology of dogmatic assertions, the effect on our officers is likely to be in favor of the thing so criticised. Unfortunately too, none of the critics of the A.E.F. Division appear to have consulted the readily available official records. As a consequence, many of the criticisms are wholly incorrect or are so worded as possibly to carry an incorrect impression. For example, General March in his book *The Nation at War*, says that Marshal Joffre recommended that we organize our divisions on a basis of 12,000 combatants per division. This is incorrect. General March also speaks of confusion resulting from references to 50 American and 100 English Divisions in France. We never had 50 Divisions in France and the British never had 100 Divisions in France.

I should like to see a radical reorganization of the present division. The first step in discussing such a reorganization is to clear the ground of any diatribes for or against the A.E.F. Division. The simplest way of accomplishing this would appear to be to give a somewhat comprehensive account of the origin of the A.E.F. Division and at least a summary account of how our present division came into being.

I was one of the "cohorts" of General Pershing. In addition, the following indicates some familiarity with the facts. I was attached to the Viviani-Joffre Mission during its stay in the United States. My particular duty with the Joffre Mission was with Colonel Remond and Major Requin who were the working members of Marshal Joffre's staff in so far as organization and allied matters were concerned. I accompanied General Pershing to France and was one of the officers assigned to the duty of working out the organization of the A.E.F. My duties throughout the existence of the A.E.F. brought me into in-

timate contact with all questions of organization. I was General Pershing's Chief of Staff when the General, in 1920, forwarded his recommendations on the reorganization of the division. I was a member of the War Department Board or Committee which recommended the prototype of the present division.

In a few cases, I shall rely on memory. I believe, however, that in these cases my memory is fairly accurate. In any event, there is a mass of readily available official records in the War Department from which my statements may be checked and from which the subject may be further developed.

When on April 6, 1917, we declared war, our organization was based on the National Defense Act of 1916. This law prescribed, in great detail, the organization of units up to and including the division. While the law gave the President authority to vary the organization of brigades and divisions, no such authority existed for changing the organization of regiments or the strength of companies. Legal authority for such changes was not obtained until May 18, 1917. Under the Act of 1916, the infantry of the division consisted of three brigades of three regiments each. The regiment had three battalions of four companies each. The war strength of the company was one hundred and fifty men. Tables of Organization (based on the Act of 1916) gave a total divisional strength of 28,256. These Tables of Organization were formally approved on May 3, 1917. It is an interesting fact that these Tables were apparently obsolete before they were approved. On May 2, 1917, General Pershing, then commanding the Southwestern Department, was directed to select the four infantry regiments destined to form the First Division. Even before this, the War College Division of the General Staff, at that time charged with organization, appears to have been virtually unanimous in the opinion that nine regiments of infantry to the division were too many. Indeed, this was one of the very few questions of organization on which a large majority of officers have ever been of one opinion. Most officers, certainly most of those at the War College, apparently were of the opinion that one hundred and fifty men were not enough for the company of infantry.

The conclusion that nine regiments to the division made an unwieldy organization was undoubtedly due, in large part, to reports received from our Military Attaches and from our special mission in France. The apparent delay in reaching the decision to reduce the number of regiments per division was probably due to the fact that detailed information was difficult to secure until it became certain that the United States would enter the war. Then, of course, Great Britain and France became lavish with advice. Through Gen-

eral Lassiter, Military Attache in London, and Major Logan, Chief of the American Mission in Paris, the War Department obtained all kinds of British and French views on our participation in the war; organization was not neglected. The British Mission headed by Mr. Balfour, and with General Bridges as its senior military representative, reached Washington on April 22, 1917. The Vивиanni-Joffre Mission reached Washington on April 25th. With the arrival of these missions, the War College Division of the General Staff was able to get first-hand information and advice on organization. An examination of the official records of reports from abroad and of conferences held at the War College shows that England and France both insisted that nine regiments of infantry with a total of twenty-seven battalions was out of the question.

The French favored a division of three or four regiments of infantry, each regiment to have three battalions. On May 14, 1917, on the eve of his departure for France, Marshal Joffre handed Secretary Baker a memorandum. In this memorandum, the Marshal set forth a programme which he conceived had been agreed on between the French Mission and the United States. Two short extracts (translated) from the Marshal's memorandum are of interest:—

"In order to show as soon as possible the American Flag upon the French front the United States will send an expeditionary force of one division of all arms with a strength of from 16,000 to 20,000 combatants, containing, in principle, 4 regiments of infantry, 12 light batteries, 6 heavy batteries and the necessary services."

"The organization of the American Army will be based on the adoption of a grand combat unit similar to the type recognized as best adapted to modern war, that is to say an Army Corps of two divisions each of three or four regiments and each corps perhaps having, in addition, a reserve brigade of infantry."

On May 21, 1917, the War College Division submitted Tables of Organization for the Division. These Tables were approved on May 24th with the notation:—"For the first expedition to be sent to France." This "first expedition" was the First Division. The following extracts from the memorandum of the Chief, War College Division, in submitting the Tables to the Chief of Staff are of special interest:

"With reference to the above Tables of Organization, attention is invited to the following:—

(a) The effective strength of a company of infantry is placed at 200 enlisted men. This strength is the minimum recommended by the officers of the French Mission who have been consulted on the subject. It is probable that experience will demonstrate the advisability of increasing this number to 250 enlisted men, as is now adopted by the British and contemplated by the French. * * *

(b) One company in each battalion is converted into a machine gun company of 12 heavy machine

guns. It may perhaps be more advisable in organizing the large force to be raised, to retain the four companies of the battalion and to assign to each battalion one machine gun company. * * *"

This tentative organization of the division contained two brigades of infantry, each of two regiments of three battalions. The infantry battalion had three rifle companies and one machine gun company. The field artillery component was a brigade of three regiments, each of six four-gun batteries. The aggregate strength of the division as recommended by the War College Division was 18,992. "Minor changes" in organization seem, for some unknown reason, always to result in an increase in aggregate strength. In this case, the minor changes made by the War Department brought the authorized strength up to 19,492. It may be noted that the increase in the size of the rifle company and the restoring of one rifle company to each infantry battalion, foreseen by the War College Division as probably desirable, would bring the division up to an aggregate strength of 24,352.

Such was the division worked out in conference between the War College Division of the General Staff and the French Mission.

Before leaving Washington for France, General Pershing was directed to investigate and report on all matters of organization. Soon after our arrival in France a War Department Board, known as the Baker Board, arrived charged with the same mission. Such a duplication of effort might easily have led to conflicting opinions, delays, and confusion. However, with a view to avoiding these evils, General Pershing arranged and presided over a joint conference between his staff and the Baker Board. This conference was held early in July. No serious difference developed in so far as divisional organization was concerned. The conference agreed on the division recommended by G-3, A.E.F., and General Pershing endorsed this organization. In due time the War Department approved, what has now become known as, the A.E.F. Division.

The recommendations of G-3 on the organization of the division were formulated after study of all available information and after visits to French and British General Headquarters. The officers of G-3 who did most of this work were General Hugh A. Drum and the writer.

During our conferences at French G.H.Q., we found French opinion very strongly in favor of four regiments of infantry of three battalions of four rifle companies of 250 men each to the division. At the time of these conferences, a part of the French Divisions were organized on a four regiment basis while a part had been reduced to a three regiment basis. We were told that the reduction, begun in 1916, of the infantry in a part of the French Divisions was due solely to the crisis in man power. The complete story of this crisis and the changes in organization which he proposed has since been told by Marshal Joffre in his Memoirs.

As is well known, the regiment plays no part in British divisional organization. The comparison must

be made in terms of battalions. When we visited British G.H.Q. we found very positive opinion that the division should contain twelve battalions of infantry; the equivalent of four of our regiments. The British Divisions were at the time on a twelve battalion basis. We were told, however, that the British War Department had, on account of the crisis in man power, suggested reducing the number of battalions per division to nine. The British G.H.Q., was very much opposed to this reduction and at that time considered a reduction in the number of divisions as preferable. Details as to this difference of opinion may be found in *Soldiers and Statesmen* by Sir William Robertson and in *Sir Douglas Haig's Command* by Dewar and Boraston.

Formerly the determining factor in divisional organization was largely a question of infantry. Artillery and auxiliaries were simply allotted in conformity with the strength decided on for the infantry. We were, however, entering a war which had become "stabilized." In fact, at the time we entered, the war showed most of the characteristics of siege warfare. On this account, and for other reasons, the relative importance of artillery had greatly increased. We had not, of course, reached the point, as a few thought, of being forced to build the divisional organization around the artillery component. But the character of the war was such that it was vitally important that the artillery of the division should be strong and suitably organized. So far as I recall, there was little difference of opinion, Allied or American, in assigning as the artillery component of our division a brigade of three regiments of six four-gun batteries each. In view of the characteristics assumed by 1917 in the World War, it seemed essential to have constantly with the division that much artillery. Far more artillery would of course be required not only in active but even in many quiet sectors, but organic divisional artillery in the quantities indicated was considered essential.

Questions of organization are always interrelated. In our case, organization, especially in so far as concerned artillery, was inseparable from matériel. Obtaining artillery matériel was one of the most difficult problems the A.E.F. had to solve. If the artillery of the division was to be strong, it was necessary, from the standpoint of artillery matériel, that the infantry component be strong also. Otherwise, most of our guns would have had to remain constantly in the line and divisions would have lost their organic artillery. Even as it was, far too many divisions lost their organic artillery for long periods of time.

French and British advice and artillery questions favored the so-called big division. G-3 had various reasons of its own for favoring the big division. One of these reasons should be mentioned. We could foresee difficulty in finding commanders and especially staffs for the very large number of units which in any case we must organize. That these difficulties were overcome was one of our great successes. Whether or not we would have been so successful had we been

forced to find, say, twice the number of staff officers is of course a matter of opinion.

The division adopted by the War Department on the recommendation of the A.E.F. and the Baker Mission numbered 27,123. Various minor changes were made from time to time. Following the apparently invariable rule, these changes increased the aggregate strength. On November 11, 1918, the authorized strength of the division was 28,105.

After the Armistice, General Pershing convened a board known as the Superior Board. One of the purposes of this board was to consider the organization of the division in view of the lessons of the war. The members of the Superior Board were Generals Dickman, J. L. Hines, Lassiter, Drum and Burt, and Colonels George R. Spalding and Parker Hitt. Since some of our officers were in short pants during the World War it may be well to give a brief statement of the war services of the members of the Superior Board.

General Dickman commanded a division and a corps in battle and after the Armistice commanded the Third Army. General Hines went to France with General Pershing. After serving for a time at G.H.Q., General Hines went to troops and commanded in succession and in battle, a regiment, a brigade, a division and a corps. General Lassiter was, when we entered the war, Military Attache at London. He visited the British Armies on various occasions. After joining the A.E.F., General Lassiter was the first American Chief of Corps Artillery engaged in battle. When the Armistice came, General Lassiter was Chief of Artillery of the Second Army. General Drum went to France with General Pershing. General Drum was a member of the Operations Section, General Staff, G.H.Q., until the First Army was organized. General Drum was then appointed Chief of Staff of the First Army and served as such throughout the Battles of St. Mihiel and the Meuse-Argonne. General Burt was at first in the A.E.F. Air Service and later served in battle as Chief of Staff of the Fifth Corps. Colonel Spalding served in battle as Chief Engineer of a division and as Chief Engineer of the First Army. Colonel Parker Hitt served in G-3, G.H.Q., and in battle as Chief Signal Officer, First Army.

General March was Acting Chief of Staff and Chief of Staff from March 4, 1918 to June 30, 1921. His views should, therefore, be examined and weighed. However, General March left the A.E.F. before our divisions began to function in battle. On the whole, it is believed that the combined experience of the members of the Superior Board should carry as much weight on matters of divisional organization as should the opinion of General March.

The report of the Superior Board was dated July 1, 1919. The Board recommended a division organized, virtually identically, as the A.E.F. Division but with a strength of 29,199. General Pershing forwarded the report to the Secretary of War by indorsement dated June 16, 1920. The first paragraph of this indorsement read:

"I have held the Report of the Superior Board in order that the important matters covered by it might be most thoroughly considered.

The recognized ability of the officers who composed the Superior Board entitles their opinions to great weight. But I think that the work of this Board was undertaken so soon after the close of hostilities that the members were unduly influenced by the special situation which existed during our participation in the World War. Thus, in my opinion, the recommendations of the Superior Board are based upon the necessities of stabilized warfare in Western Europe rather than upon the requirements of warfare of the character and in the theater upon which we are most likely to be engaged."

General Pershing recommended an organization based on the "three unit system" and outlined a division counting approximately 16,875 officers and men.

On June 2, 1920, there was convened in the war Department a board or committee which on July 8, 1920 recommended an organization similar to the A.E.F.

organization but with a strength of 19,217 officers and men. In approving this recommendation, General March, then Chief of Staff, directed that the brigade of artillery of two regiments recommended by the Board be increased to three regiments when a light field howitzer became available. This post war division has now grown to 22,068 officers and men and requires a road space of 63,080 yards, or 35.8 miles.

I am heartily ashamed of the fact that I signed the War Department Board Report of July 8, 1920.

I am more convinced than ever that we should radically change the organization of the Division.

But I am equally convinced that the A.E.F. Division served its purpose well. Under the conditions of the World War, and of our forces, when we entered the war, the A.E.F. Division was probably the best we could have devised. The report of the Superior Board supports this belief. That report should be interpreted as indicated in the above-quoted comment by General Pershing.

Errata

WE ARE indebted to the author, Major Fred M. Green, for calling our attention to several typographical errors which occurred in his article on the "Evolution of the Infantry Drill" as it appeared in the March-April issue of the JOURNAL.

The JOURNAL exercises all reasonable care to prevent mistakes occurring but our staff is too limited to guarantee a hundred per cent performance. We are always glad to acknowledge our errors, apologize to the author and make amends in whatever way we can.

On Page 119, in line five of the explanation appearing under figure 1, the date "1916" should read "1616." Also, on this same page the last sentence of the first paragraph, right hand column, should read "Fire-power was *now* a reality."

On page 123, next to the last line of the right hand column, the date "1885" should read "1855."

Perhaps the casual readers would not have detected these errors but for the precise student accuracy is of prime importance.

Orientation Guide for Mobile Coast Artillery Reconnaissance Officers

By 1st Lt. E. Carl Engelhart, CAC, and 1st Lt. Floyd A. Mitchell, CAC

This article presumes that the interested readers, if any, are acquainted with the standard grid system, astronomical determination of azimuth, and elementary surveying. Many statements herein are peremptory, it being easier to say "will" instead of "it would be nice if—." The "will" may become applicable at some future date, for many paragraphs of this guide have been lifted bodily from a training manual now in embryonic state. Acknowledgement is hereby made to the officers who have labored on the training manual manuscript.

"A T THE command 'Prepare for Orientation,' the reconnaissance officer sharpens his pencil." The importance of orientation merits such a concise procedure couched in the inimitable style of the drill of the piece. Unfortunately, however, the situation confronting a reconnaissance officer in orientation varies considerably with the time and the place. It is hardly practicable to list separate procedures for every conceivable situation. The methods outlined herein are therefore made elastic enough to fit most common conditions, and may be stretched to fit other situations.

The importance of orientation cannot be minimized. for a battery is never ready for action until its elements have been oriented. The time when a battery is ready to open effective fire normally depends on the time it takes to establish the communication net and to complete orientation, and *not* on the time consumed in moving into position. It therefore behooves a reconnaissance officer to complete the orientation phase in the least possible elapsed time. He should so organize his field section that the field work can be completed and the computations made as rapidly as possible. He should take every possible short cut, such as computing field notes concurrently with the field work. This is entirely practicable if the azimuth has been established at the beginning of the traverse.* If it is necessary to rely on astronomical determination of azimuth, cloudy weather is no excuse for delay. The reconnaissance officer should immediately assume a starting azimuth for his traverse and then proceed with the field work. Later, when conditions permit, correct azimuth may be determined astronomically, and then the temporary data converted by the method indicated subsequent hereto.

In general, the duties of a reconnaissance officer may be considered as tactical and technical. The technical duties deal principally with topographic work, the organization of O.P.'s, and the control of plotting details or range sections. It is with the technical duties we are now concerned.

A reconnaissance officer's orientation detail will consist of a transit traverse party comprising one master gunner (instrument man) and seven assistants (1 recorder, 2 chainmen, 2 rodmen, and 2 computers). Since

orientation duties will not ordinarily begin until after positions have been selected by the reconnaissance party and will be completed before the opening of fire, the orientation detail will usually be made up of members of the reconnaissance party. If distances are being measured by stadia, the two chainmen may be omitted from the detail, and it may be remarked here that the present trend of thought is toward using a stadia rod graduated in yards. If it is desired to run two traverses simultaneously, the additional men necessary will be taken from the reconnaissance party.

Regimental Reconnaissance Officer

The duties of a regimental reconnaissance officer are principally tactical. In connection with orientation, however, he will secure—either from higher military unit headquarters, U. S. Coast and Geodetic Survey or Geological Survey records, or from other reliable sources—all available topographic information for his regiment's area. He will, in particular, obtain geographic or grid coordinates for any existing triangulation stations, bench marks, or datum points which may possibly be of use in orientation work.

The regimental reconnaissance officer will furnish the battalion reconnaissance officers the data for known points in their areas. When information is completely lacking for known points in the regimental area, the regimental reconnaissance officer will supervise the selection of an origin for a system of local plane coordinates, and he will exercise general supervision over field work to prevent duplication of effort in the battalions.

The regimental reconnaissance officer is also responsible for the location of regimental observation posts and the establishment of orienting lines for them. In most situations, the determination of coordinates by picking them off a map and of the azimuths by compass will be sufficient for regimental headquarters' demands for accuracy.

Battery Reconnaissance Officer

The range officer of a battery will normally also be the battery reconnaissance officer. He will, under the direction of his battery commander, select at the assigned positions for the battery observation stations the exact spots to set up his observing instruments, marking these spots with serviceable stakes bearing both a legible designation of his battery and also that of the station. He will then act as an assistant to the

*See the article "Speeding Up the Orientation of Mobile Batteries" in the March-April number of the COAST ARTILLERY JOURNAL.

battalion reconnaissance officer until the orientation phase is completed. In addition, he will compute from data furnished him by the battalion reconnaissance officer the baseline length and azimuth, the data necessary to locate the battery directing point on the board, and the gun differences.

Battalion Reconnaissance Officer

Section I

Specifically, it is the duty of a battalion reconnaissance officer to determine the coordinates and an orienting line for the battalion O.P. and for the battery directing points and observing stations. He will not, however, compute baselines unless the battalion observing section is using a bilateral method. In such a case he will probably be the battalion range officer in addition to his other duties, and he will then compute his own baseline. The computation of *battery* baselines is entirely a responsibility of the respective battery commanders.

Procedure:—

1. The battalion reconnaissance officer will accompany the battalion commander on his reconnaissance, noting positions selected for observation stations and directing points.

2. The battalion reconnaissance officer will secure from the regimental reconnaissance officer such topographical data or other information which is available. When the battalion is detached from the regiment, the battalion reconnaissance officer will consult the reconnaissance officers of adjacent battalions or other artillery units already established in the vicinity, in order to:

a. Determine the kind of coordinates and azimuths in use in that area.

b. Coordinate his topographic work with any in progress or already completed, to avoid duplication.

c. Obtain coordinates, standard grid (preferably) or local plane, of any known points in his area.

3. If the battalion is operating as seacoast artillery in a harbor defense, he must tie his system in with that already established in the harbor defense. He should also determine whether grid south or true south is being used as zero azimuth. Many harbor defenses use true south. In tying in with the harbor defense system, he should also determine whether local plane or standard grid coordinates are in use. Some of our older harbor defenses still use local plane coordinates. If the battalion is operating as seacoast artillery outside a harbor defense, he will usually establish his own system, based on standard grid coordinates and grid azimuths, grid *north* being zero azimuth.

4. Failing to obtain data under par. 2 (c), the battalion reconnaissance officer will consult U. S. Coast and Geodetic Survey tables or records at city engineer's offices or local county courthouses in order to obtain the geographic coordinates of known geodetic points in his area. Care must be taken in identifying datum points on the ground. U. S. Coast and Geodetic Survey triangulation stations, for instance, bear an isosceles

triangle with a dot in the center; a bench mark has a circle instead of the triangle. A witness tablet or reference mark must not be erroneously used as a datum point. Such a mark is placed merely to assist in finding the true monument. For example, a concrete monument is discovered with a bronze plate imbedded in it, the plate being enscribed "York 3 No. 2" and having an arrow in its center. This is a reference mark, and the arrow points in the direction of the true "York 3" triangulation station. The designation also indicates that another reference mark, No. 1, is somewhere in the vicinity, and the next datum point turned up should be scrutinized for the infallible sign of a triangulation station, the isosceles triangle.

5. Failing to obtain data for any known points in his area, the battalion reconnaissance officer will then select a well-defined and permanent point in his area as the origin for his own system of local plane coordinates, arbitrarily assigning coordinates to that point with values large enough to prevent the occurrence of negative coordinates; $X = 100,000$ and $Y = 100,000$ are usually satisfactory. The proper instruments are not ordinarily available for a reconnaissance officer to determine geographic coordinates with sufficient accuracy by astronomical means so that he can establish a standard grid system.

6. The battalion reconnaissance officer will then notify battery reconnaissance officers (range officers) when and where he will require their assistance in the computations. These officers should be made available for this duty.

Section II

Geographic Coordinates Known

The procedure of the battalion reconnaissance officer, if he has to rely on data obtained as outlined in par. 4, Section I, namely the geographic coordinates of certain points in his area, is as follows:

1. He plots approximately on his map the known geodetic points and the points for which he must compute grid coordinates and orienting lines.

2. He then makes a short reconnaissance, in order to:

a. Determine which of the known geodetic points are intervisible.

b. Select a starting point for his field work, preferably a known geodetic point which can be occupied by the transit party.

c. Determine the method of locating the points for which he must compute grid coordinates and orienting lines, i.e., by traverse, resection, or intersection. Triangulation will usually be most desirable. Resection will be seldom used unless one point is so remote from the other points that its coordinates cannot be conveniently determined by triangulation or short secondary traverse.

d. Select at each point for which he must obtain grid coordinates and orienting lines (observing stations, O.P.'s, and directing points) one or more suitable well-defined distant landmarks as datum points. It is advisable to have for each station two datum points separated by about 90° of arc.

e. Select the most favorable route for his traverse and decide whether to have it close on itself or on another known geodetic point.

3. He then establishes, either before or after beginning field work—(see par. 6, this section)—an azimuth at the starting point of the traverse by one of the following methods:

a. He may compute the grid azimuth of the line joining two of the known geodetic points, one of which is the starting point for the traverse.

b. He may take an astronomical observation at the known geodetic point which is being used as the starting point for the traverse, if no other known geodetic point is visible from that station, and then convert this true azimuth into grid azimuth by the method outlined in Special Publication No. 59, U. S. Coast and Geodetic Survey, entitled "Grid System for Progressive Maps in the United States."

c. He may assume an azimuth at the known geodetic point being used as the traverse initial station, if no other known geodetic point is visible from there and if the weather prohibits taking an astronomical observation. This sets up a temporary local plane system, but the field work can be completed immediately and orientation data computed. As soon as astronomical determination of azimuth is feasible, the fictitious starting azimuth may be converted into proper grid azimuth and the computed orientation data may be changed into standard grid equivalents by means of the formulae given in Special Publication No. 59.

d. It is possible that no known point may be occupied by a transit party. This is not an unlikely situation. In such a case, the battalion reconnaissance officer may either:

(1) Establish an "eccentric" transit station close to one of the known points, and reduce to center as explained in par. 60, TR 435-325.

(2) Establish the traverse starting point so that two known points are visible, and then compute the coordinates and grid azimuth of the starting point by means of mathematical resection. This is covered by pars. 54 and 55 of TR 435-325.

4. The battalion reconnaissance officer then acquaints his master gunner (instrument man) with his plan for field work:

a. Traverse starting point.

b. Initial azimuth, if available. (See par. 6, following.)

c. Traverse route.

d. Method of measuring traverse distances.

e. Points (for which he must obtain orientation data) to be included as stations in the traverse, and such of the points off the traverse to be located by intersection or otherwise.

f. Datum points for each point in subpar. e, above. To obtain orienting lines, it is necessary to set up the transit on each of these points and

actually turn off the angle between a convenient traverse station and the datum point.

5. He then supervises the field work of the traverse party.

6. Computation of field notes is accomplished in the following manner:

a. When computations are to be made after field work has been completed, the procedure is:

(1) Convert geographic coordinates of the known geodetic points into standard grid coordinates by means of the tables in Special Publication No. 59.

(2) Establish grid azimuth at the traverse starting point.

(3) Adjust traverse for error of closure in azimuth. If the total error is greater than one-half minute per transit station in the traverse, a mistake is indicated, a mistake which can only be rectified by sending out the transit party to shoot their angles again. If the error of azimuth closure is greater than three minutes (about one mil.) but is still less than the allowable error of one-half minute per transit station, the traverse should be adjusted in azimuth. This is done simply by dividing the total error by the number of transit stations in the traverse, and then applying this average correction to each traverse azimuth. Larger-than-average corrections may be applied to short sights as they are more subject to inaccuracy.

(4) Compute the traverse according to the method outlined in par. 46, TR 435-325.

(5) Adjust traverse for error of closure in distance in a manner similar to the azimuth adjustment. Long shots, in this case, may be overweighted in applying corrections.

(6) Compute data for points off the traverse which have been located by intersection or otherwise.

(7) Evaluate orienting line azimuths for the datum points assigned each observing station, O. P., and directing point.

(8) Scale off a map by referring to the contours the elevation of battery directing points and such observation stations which may require this information.

(9) Tabulate the following compiled data:

(a) Coordinates, elevation, and orienting line azimuths for each battery directing point.

(b) Coordinates, elevation (when required), and azimuths of orienting lines for each observing station and O. P.

b. When computations are to be carried on concurrently with field work, it is necessary to establish grid azimuths at the traverse starting point before beginning field work. The traverse is then computed in the same manner as stated before. When, upon completion, it is found that the azimuths do not close or check, it must be decided if the error of closure is excessive. If so, azimuths must then be adjusted and the whole

traverse recomputed. The error of closure in distance may also be adjusted, if necessary. Other steps in the procedure are as given previously in subpar. a, where applicable.

7. The battalion reconnaissance officer will then distribute two copies of the respective orientation data to each of the batteries. Two copies of the data for the entire battalion go to battalion headquarters and one copy to regimental headquarters.

8. The first clear night after all positions have been occupied and instruments oriented, the battalion reconnaissance officer will arrange to have all observers take simultaneous readings on a low star. (Consideration should be given to the possibility of bore-sighting guns on the same star at the same instant.) A comparison of readings will indicate whether or not the orientation of all stations is correct.

Section III

Grid Coordinates Known

The procedure of the battalion reconnaissance officer when he has obtained the standard grid or local plane coordinates of two or more points in his area—as mentioned under par. 2, Section I—is in general the same as outlined under Section II.

The problem is simpler, however. The “known points” in this case do not have geographic coordinates of latitude and longitude but are already fixed by usable grid coordinates.

Establishment of azimuth is accomplished in the same general manner as outlined in Section II, and further steps are readily apparent by following the procedure given in that section.

Section IV

No Coordinates Available

The procedure of the battalion reconnaissance officer under the conditions covered by par. 5, Section I—no data of any kind available—also differs but slightly from the procedure in Section II.

The battalion reconnaissance officer plots approximately on his map the point selected as the origin for his local plane system and the points for which he must obtain grid coordinates and orienting lines. He must, however, determine true north from this origin, astronomically. This true north then becomes his grid north.

In selecting a starting point for his field work, it will simplify computations if the chosen origin can be used as a traverse station, or at least can be occupied to obtain true north. If this is not possible, then two traverse stations must be located in view of the origin, and the distance between them accurately determined. Azimuth at one station must be obtained astronomically. Then, by triangulation on the origin, coordinates of the traverse stations may be computed. Actually, this method will not produce a true local plane system according to definition, because grid north will not coincide with true north at the origin, and it becomes necessary to record a secondary origin, that for azimuth, for any computations involving convergence of meridians.

With a brand new local plane system, the only possible means of determining error of closure in traverse distance is to have the traverse close on itself. Azimuth closure, however, may be checked by astronomically determining azimuth at the distant end of the traverse.

Magnification of Scale

No previous mention has been made in this dissertation of the magnification of scale error in connection with standard grid coordinates. Its effect is that azimuth and distance computed from standard grid coordinates may not be exact, due to the fact that ΔY contains the error of polyconic projection, a distortion of scale. Uncorrected grid distance on the map is always greater than the true distance on the ground.

Table K of TR 435-325 lists the magnification of scale error per 1,000 yards of ΔY .

When converting map distance into ground distance, subtract the Table K correction.

When converting ground distance into map distance, add the Table K correction.

Every copy of TR 435-325 in the service should have the preceding rules inscribed across Table K.

Reference to the table will show when the magnification of scale error is large enough to warrant correction.

Antiaircraft Gun Battalion

The amount of orientation accomplished by the battalion reconnaissance officer of an AA gun battalion will normally depend on whether the battalion is being employed in a moving or in a stable situation.

If the battalion is moving, time is usually so limited that it is not practicable to survey a baseline for spotters. Location of batteries, then, will generally be picked off a map, and an orienting line arbitrarily established for each battery position. No appreciable error in firing data will result if the assumed north is in error only a few degrees, provided all elements of the firing battery are based on the same orientation. If the director is to be located at a considerable distance from the guns, the battalion reconnaissance officer will measure this distance and derive the East-West and North-South parallax corrections. If time does not permit him to do this, he should notify battery commanders so that they may proceed with their own orientation.

In a stable situation, the battalion reconnaissance officer will locate battery positions, directors, (if there is parallax), spotting stations, and the battalion O. P., and establish an orienting line for each.

Conclusion

It has been assumed that a battalion reconnaissance officer will normally relieve battery personnel of most of the field work of orientation, yet it is essential that every battery officer understands the fundamentals of orientation and be prepared—in an emergency—to orient his battery and its outlying stations without dependence on outside assistance. It is important, therefore, that all battery officers be acquainted with the duties of a battalion reconnaissance officer in connection with orientation.

Riot Service

By Captain Frank T. Balke, Infantry, Ohio National Guard

"CAPTAIN, Co. A, Xth Infantry," Wyhio National Guard sat quietly reading in the snugness of his comfortable home. It was the evening of March 1, and outside March was making it apparent to the world in general that it intended to "come in like a lion." Captain A's thoughts were far from his military organization, and even considerations for the impending Federal Inspection were crowded out by more pressing family issues. True, away over in western Wyhio the ordinarily placid countryside was seething with unrest due to trouble in its most potent industry—coal. Violence had occurred, but once it had been judiciously hushed up by the papers, Captain A had scarcely given it a thought. Little did he realize that in twenty-four hours he and his band of guardsmen would be in the midst of the disturbance.

Captain A was tired and sleepy, and at nine o'clock had begun to turn out the lights before retiring when the doorbell rang. It was a telegram. Did Junior, up at Wyhio State University need more money? No, the telegram was prepaid. The captain opened the envelope, and read:

Capitol City, Wyhio,
March 1, 1932.

Capt. A, Xth Infantry,
Smithville, Wyhio.

Proceed at once Mineville Wyhio with two officers and forty men stop report to sheriff Mineville County. Copy of orders No. forty-eight AGW follows.

Adjutant General Wyhio.

Whether Captain A's mind was now completely flooded with conflicting and contradictory thoughts, or whether his reaction followed a well-planned, pre-conceived course depended entirely on whether he or any officer had borne in mind one of the functions of the National Guard—to be capable, at existing strength, to function in a minor emergency. Captain A, fortunately, had, and his plans had been carefully laid long ago, for just such a moment. Let us break into the narrative for a moment to follow Captain A's methods of preparing his company for this type of service.

Captain A's organization was located in the one-armory town of Smithville, Wyhio. It was an industrial center, and it numbered among its one hundred thousand people, a certain minority that was distinctly hostile to the National Guard. He realized that many recruits in this organization had been met with the accusation that National Guardsmen were "strike-breakers," and that they would shoot their relatives and fellow-workers. Therefore his first duty was to adjust their mental attitude. In his past experience, he had never observed any derelictions of duty because of this condition, but he believed that it should be corrected. Therefore he managed to hold a conference with each group of recruits within a few weeks

after their enlistment. Here he would explain to them the set-up of the national defense, and the place occupied in it by the National Guard. He would impress upon them the fact that never in history had the National Guard been called to "break a strike," that it was called out only when the power of the local police authorities to protect life and property, had been broken down, and that the National Guard was interested in neither side of the dispute. Its sole interest being to preserve order. If organized strike-breakers threatened the lives and rights of the strikers, then the National Guard would protect the latter in exactly the same impartial manner as though the contrary had been the case. He would explain to them that if the National Guard were unsuccessful in its efforts, that the Regular Army could be called in, and if the disturbances grew to sufficient proportions to be still out of control, every able-bodied man in the state could be drafted for the purpose. It was therefore as unfair, he pointed out, to give the National Guard a soubriquet of "strike-breakers" or the Regular Army, either, for that matter, than the entire male population. The captain explained to his men that a soldier's action on duty is entirely impersonal, that he represents constituted authority, which in turn is set up by the will of the majority, as expressed at the polls.

The men of Company A were continually impressed with the necessity of being available for immediate call. Shortly after their enlistment Captain A sent each recruit a mimeographed letter on this subject. It was composed of four paragraphs and included:

1. The necessity of being prepared for prompt mobilization.
2. To report change of address, telephone number, or place of business, to the company commander immediately.
3. In the event of leaving the city for a period of more than forty-eight hours, each man must notify his company commander.
4. In the event of call to active duty, to report to the armory at once, bringing the following list of articles which must be kept on hand at all times:

Underwear, suits	4
Socks, wool, pr.	4
Brush, tooth	1
Paste, tooth	1
Comb, hair	1
Cream, shaving	1
Brush, shaving	1
Razor, with blades	1
Mirror, hand	1
Towels, bath	2
Soap, hand	1
Box, soap	1
Kit, sewing	1
Flashlight, with batteries	1

Captain A had never failed to give a place in his yearly training schedule to riot drill. His squads, sec-

tions and platoon were capable of executing the "wedge" formation quickly and without confusion. They had been taught to hit a mob from the flank or rear whenever possible, and from such an angle that the retreat of the crowd in the opposite direction is easy. He had impressed on his command the necessity of hitting a mob on the run, and had drilled them in the method of extracting the leaders from the mass. He had requisitioned night sticks from the state quartermaster, and, fortunate enough to receive them, had instructed his personnel in their use, realizing that this weapon is extremely effective and spares blood.

On one drill night of each year, Captain A had lectured on the legal aspects of riot duty. His explanations were simple and concise, and were followed by a questionnaire. "In Wyhio," he said, "the National Guard may be ordered out as aid to the civil authorities or under martial law. It is extremely important that all of you understand the distinction. In the former case, your troop commander reports to the sheriff of the county where the trouble has arisen. Within the scope of his orders he acts under the instructions of the sheriff. In this capacity the commander of troops is shorn of a great deal of his initiative and authority. It is customary for the sheriff to issue a proclamation upon the arrival of the troops, prescribing certain emergency regulations and authorizing the guardsmen to enforce them and to arrest offenders. Troops must be careful not to exceed this authority. The interpretation of such a proclamation may vary, and it is important that any points in question be ironed out. Care must be taken to exercise no military authority outside the jurisdiction of the civil officer or officers requesting the presence of the troops. You may not make arrests in neighboring counties without first notifying its law officers."

The captain pointed out that all civilian prisoners must be turned over at once to the authority ordering their arrest. Every possible means should be taken to maintain cordial relations with police authorities in the county. When troops are acting in the capacity of aids to the civil authorities, many perplexing and difficult problems arise, particularly when police are hostile.

In Martial Law, the situation is entirely different. In such a case the Writ of Habeas Corpus (which the captain explained) is suspended within a certain geographical section prescribed by the governor. The authority of the civil authorities is shorn, and they function entirely under the military. Persons may be tried by military courts, but the decisions of such courts are subject to later review by the higher civil courts.

It is essential that all officers and men thoroughly understand the question of liability in the case of a civilian killed by a soldier while on riot service. The Militia Bureau's manual of Riot Duty explains the issue, it should be condensed and simplified when presented to the men. They should understand that an officer of the law is justified in killing a person when necessary to prevent the commission of a felony, or to prevent the escape of one who has committed a

felony; but he is not permitted to kill one who is guilty of only a misdemeanor. It is grossly unfair to the men to send them into riot service until they fully understand the laws of their state in this respect. Likewise, military officers should defend to the limit any soldier who should become involved in a fatal shooting justified by the soldier's orders. He should be tried immediately by a general court, and retained in the custody of the military.

An interesting question arose in disorders in the Ohio Mine disturbances of 1932. A machine gun squad had been posted near the tippie of a mine, which certain elements had threatened to dynamite. The soldiers' instructions were to protect the property of the mine company and prevent injury to persons legally permitted on mine property. The sheriff's proclamation had warned all unauthorized persons from trespassing. One night, the lookout at the machine gun post heard a group of four men coming down a wooded draw near his position. He ordered them to halt three times, but, instead, they broke into a run in the direction of the tippie. The gun was fired, but, fortunately, a stoppage occurred after the first round was discharged, this shot barely missed its mark. The men were so frightened that they halted before the stoppage had been adjusted. It was found that the men were employees of the mine who had been drinking and were returning to their bunkhouse. Just what the outcome would have been under more tragic circumstances is hard to state. The military would have had to prove reasonable assumption of intention of this group to commit a felony.

Captain A has instructed his supply officer to maintain his equipment in shape at all times, and to have it available for prompt movement. He has assured himself from time to time that this order has been faithfully complied with.

In the supply room there was posted a list of equipment to be taken in case of call to riot service. In the absence of definite orders from higher authority to the contrary, Captain A will always take every item which might possibly be used in the field. He pays no attention to second hand information that field ranges, barracks bags, mattress covers, etc. are not needed. He assumes that they are, even though they are cumbersome. This is also pertinent in the case of a machine gun unit. It is difficult for the machine gun company commander to visualize the need for range finders, aiming stakes, clinometers, and other instruments in such service, but the writer's own company has used them in the past, and would have been greatly handicapped had they not been available. The question of property responsibility of course, raises its disagreeable head, but most states are liberal in approving surveys made subsequent to riot service, providing that reasonable care has been exercised.

Plans should be made to issue sufficient equipment to the men to provide for their comfort and cleanliness. Each man should be issued a barracks bag. They should wear, en route, woolen breeches and shirt. They should carry, in their bags, an extra shirt and,

in summer, cotton breeches, and an extra pair of shoes. Woolen blouses should be worn in winter and carried in barracks bags in summer, in anticipation of cold nights. Each man should carry a pair of denim trousers and a denim coat in his bag. Officers and men should wear strip packs with rolls, tagged, included in the company property dump. Officers' bedding, may, of course, also be included, but this may not always be available in the field. Full kitchen utensils should be taken.

By careful planning beforehand, Captain A has saved his command much unnecessary labor and duplication, and himself a great deal of worry and later regret.

We are now ready to follow the actions of Captain A from 9:00 P. M., March 1 until his arrival at the scene of trouble.

The reader will note that the telegram stated that copies of written orders would follow. If this had not been the case, Captain A would have wired or telephoned the State Adjutant General for written confirmation.

At 9:05 P. M., Captain A turns to a map of the state of Wyhio and locates Mineville. He finds that it is located on the Big Six Railroad's main line, and it is the county seat of Mineville County, and has about 10,000 inhabitants. He telephones the ticket office and finds that there is a train for Mineville at 10:00 P. M. and at 6:00 A. M. Because of the late hour, he decides to take the 6:00 A. M. train the following morning. It is a three hour ride, and the train is due at Mineville at 9:05 A. M. He telephones the local railroad superintendent, and requests that he be supplied with a day coach and a baggage coach, both to be spotted on a siding near the station at 3:00 A. M.

At 9:10, he telephones "Lieut. Administrative Officer" and "Lieut. Supply Officer," advises them of the situation and directs them to report to the armory prepared for active duty.

At 9:15, he telephones the telegraph company, reads them the list of names and addresses of all his men and dictates a telegram as follows:

"Report to Armory immediately prepared for active duty."

At 9:30, Captain A gathers his personal belongings and proceeds to the armory, arriving at 9:45.

By 10:30 P. M. the company officers and, we will say, thirty of the sixty-three enlisted men have arrived, while others are steadily drifting in. Captain A calls his officers and First Sergeant into his office, and issues the following verbal order:

"A situation of unrest and violence exists in Mineville County.

"Two Officers and forty enlisted men of the company will proceed to the town of Mineville leaving Smithville on the Big Six train at 6:00 A. M., tomorrow, March 2.

"You, 'Lieut. Administrative Officer' will have forms 100 and 107 prepared at once, showing this evening's work to be a paid drill. You will have necessary orderly room property prepared for baggage detail not

later than 11:15. You will notify 'Lieut. Supply Officer' when it is ready.

"You, 'Lieut. Supply Officer' will have field equipment issued to all men at once. Strip packs will be worn; rolls will be tagged and placed with company baggage. Barrack bags will be prepared as previously ordered. You will have company baggage secured for transportation, tagged and numbered, and placed in the lower hallway by 11:45 P. M. The usual baggage lists will be prepared. You will order a hot breakfast for forty-two persons at the restaurant across the street to be served at 1:45 A. M. You will also order forty-two package lunches to be ready at that time. Advise the restaurant proprietor that the bill will be paid by the state, and have a receipt made out in my name.

"You, First Sergeant, will have men roll packs at once, rolls to be tagged and disposed of as directed by the Supply Officer. You will have the company formed in the drill hall ready to turn over to me at 12:00 P. M. Uniform: Service, wool, with blouses, hats. Strip packs.

"I am going to the Big Six Depot and will return here by 12:00 P. M. 'Lieut. Administrative Officer' will be in charge during my absence.

"It is now 10:45 P. M.

"Any questions?"

Captain A now proceeds to the railroad depot with emergency transportation requests, secures tickets and checks on arrangements for spotting of special cars. On the way, he arranges with a trucking company to have a large truck at the armory at 3:00 A. M., and, if the distance from the armory to the station be great, a bus seating forty-two persons to arrive at the armory at 5:00 A. M.

The Captain returns to the armory in time to receive the First Sergeant's report at 12:00 P. M., the company being in line. He briefly explains the situation to the men. The writer also firmly believes that he should concisely state the issue which has caused the disturbance at Mineville, and the function of the National Guard there. He will next face the problem of selecting the personnel which will accompany him. In so doing he will endeavor to combine the preferences and convenience of the individuals with the best interests of the service. His order calls for one additional officer besides himself and forty enlisted men. He decides to take his Supply Officer. He determines to form a provisional platoon consisting of two sections of two squads each and the necessary overhead, as follows:

First Sergeant	1
Platoon Sergeant	1
Section Sergeants	2
Mess Sergeant	1
Supply Sergeant	1
Cook	1
Mechanic	1
Corporals, in ranks	4
Privates and Privates First Class, in ranks	28
Total	40

It is advisable to include among the privates and privates first class in ranks some individual who is

capable of assisting the first sergeant with paper work in case of necessity. He may also take a second cook in place of a man in a squad.

The company is divided into two groups, one to remain on active duty, and the other to stay at the home station. He directs the latter to report to the armory on the next regular drill night, and tells them that they will under the command of "Lieut. Administrative Officer" during his absence. This group is then dismissed.

A provisional roster is made up of the Active Duty group showing division into squads and sections, and assignments of specialists. It is now 1:00 A. M.

Captain A now determines how many of his men will be affected by this service in their employment. He makes a list and prepares a form letter to their employers, and advises them that the letter will go out the same day. He directs 'Lieut. Administrative Officer' to give this matter his personal attention at the opening of business March 2, making calls if necessary, to prevent his men from losing their positions because of their absence.

At 1:45 A. M., the company is fed breakfast at the neighboring restaurant and draws package lunches.

At 2:45 A. M. a loading detail is placed under the direction of the Supply Sergeant. The truck arrives at 3:00 A. M., is loaded, and proceeds to entraining point, accompanied by the loading detail. The Supply Sergeant and Mechanic remain with the baggage car.

At 5:00 A. M. the company proceeds by bus to the entraining point and gets into the day coach. Magazines and newspapers are distributed.

Prior to the arrival of the troops at their destination, they are encouraged to eat their cold packed lunch with hot coffee secured from some railway lunchroom on the way.

Ammunition is distributed en route. Automatic rifle magazines and machine gun belts are loaded.

Information of the general situation from higher authority is probably in the hands of the company commander prior to arrival at the destination together with the necessary instructions for detraining, but if the information is not forthcoming, he must provide for his own intelligence and security. The train must be stopped outside of the town while the company commander learns the conditions near the station. If it be determined that a hostile mob is awaiting the arrival of the troops, the detraining should occur some distance from the station. If, at this point, an unruly group appears, the detraining of personnel and materiel must be covered. This can be accomplished by a squad with fixed bayonets forming in U shape outside of the exits from the train, and by men with loaded rifles in the windows of the coach. Although bloodshed is to be avoided whenever possible, successful detraining must be accomplished at any cost.

An old story is circulated of a militia company commander of many decades ago. As his men stepped to the station platform one by one they were seized by a mob, their firearms taken away from them, and hustled off. When the company commander, last to

detrain, descended from the car he found himself without a company and with his weapons in the hands of the crowd.

A loading detail, under armed guards, handles the company baggage, which is temporarily dumped in a suitable location.

The company commander now reports personally or by telephone to the sheriff's office.

It must be remembered that the course of action given above is based upon the assumption that no higher military authority is available, which is seldom the case.

From this point on, the company commander is governed by circumstances. His own initiative, diplomacy, and good judgment will, at best, be put to the severest test. Captain A's first objective is to get control of the local situation in the immediate vicinity of his detraining point. Here the many long months of armory drill will bear fruit. Few mobs will actively resist cool, well-disciplined, armed troops. It may harass them, try to "get their goat;" it may even stone them and snipe at them, but a mob is inherently cowardly, and a determined advance with fixed bayonets will seldom be resisted by more than a scattered few of the rioters. After the mass of rioters has been dispelled the remaining fragments must be "mopped up," and from then on troops become, in reality, traffic policemen, keeping persons from gathering and insisting that loiterers "move on." Captain A has impressed on his men the necessity of totally ignoring taunts, no matter how irritating.

Having temporarily obtained control of the situation, Captain A's next obligation is toward the comfort and welfare of his men. Arrangements for quarters and messing must be expedited. If available, an abandoned factory or public building with necessary sanitary facilities may be leased. Otherwise it may be necessary to camp in the open. The same health precautions should be taken as during field training periods. Menus should be carefully prepared, and meals well-cooked and served.

In the stress of emergency, the troops will function excellently, the morale will be high. But, as the tour lengthens, and monotony creeps in, this problem becomes acute. Captain A will give it careful consideration.

The tendency to become sloppy and lax is natural, and is given impetus by the exigencies and hardships of the situation. It must be rigidly corrected. The civilian population will respect and obey troops well-kept, courteous and business-like, but will have nothing but disgust for a group of slovenly, fresh, ill-disciplined soldiers.

A schedule should immediately be arranged, elastic enough to provide for emergencies, combining the minimum of guard, patrols and fatigue with the necessary safety. Men on night patrol should be allowed to sleep well into the morning, and be served with a hot breakfast as late as 9:00 A. M. A formation should be held at 11:00 A. M., providing for a short inspection, exercise period and drill. Retreat should be held in the evening. Guard mount should be public, and held in

accordance with regulations. In this way, a good impression is made on the public, while the morale and esprit of the troops is maintained. Inspection of quarters, "short-arm" inspection, inspection of equipment, underclothing and mess facilities should be routine.

Men should be allowed all the freedom possible off duty. They enjoy movies, and arrangements can be usually made with the manager of a local motion picture house to honor chits signed by the company commander for collection next payday. The same arrangements can be made judiciously by the company commander with confectioners, tobacconists, dry cleaners, laundries, etc., which will do much toward maintaining morale. In situations where part of the command is stationed in a town and the balance in outlying districts, arrangements should be made to change the stations of the units at frequent intervals, both to relieve monotony and to allow all the men the relaxations of the town and an opportunity to "clean up."

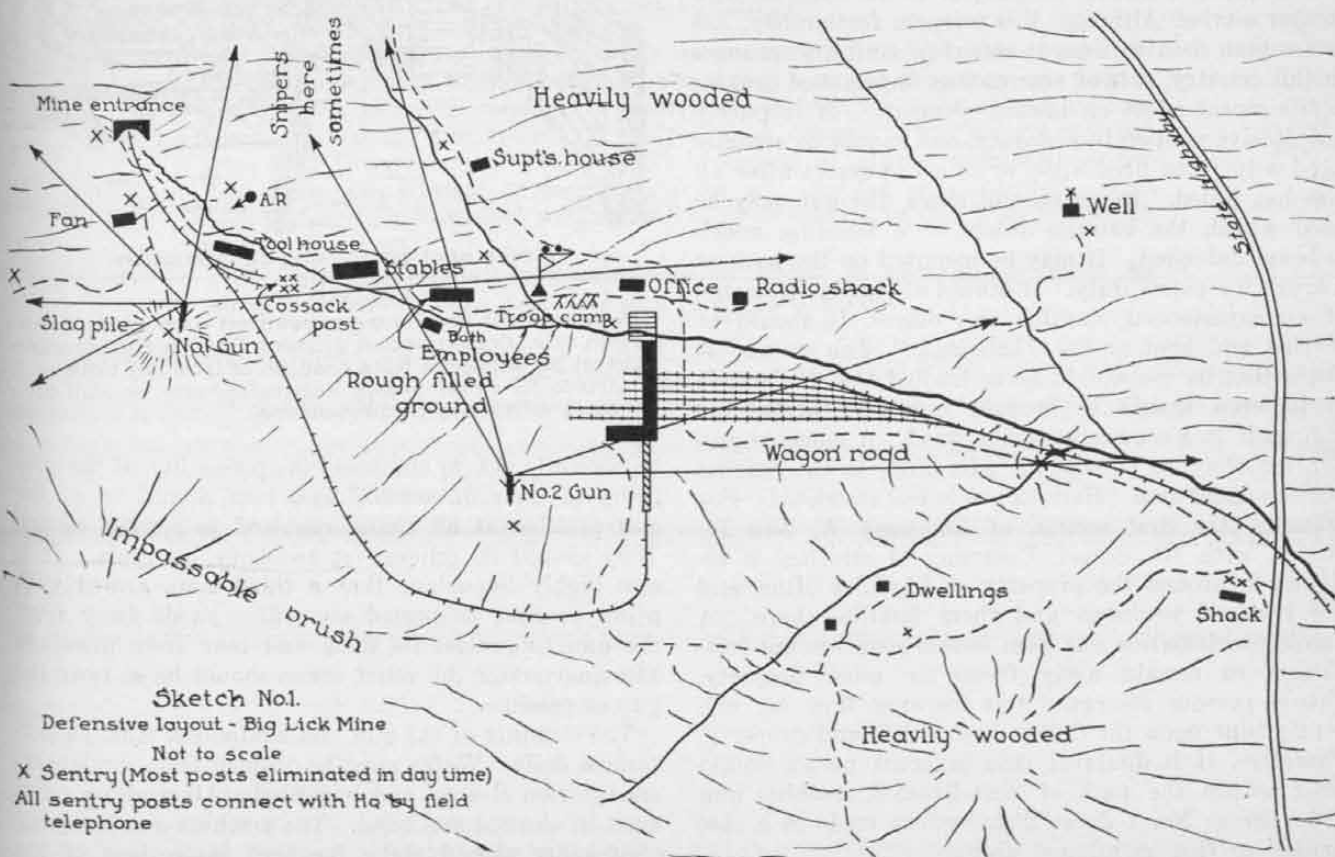
The subject of patrols and interior guard will, of course, vary greatly according to the local situation. If sufficient transportation is available, patrols should operate in automobiles. Each patrol should include: a commissioned officer, a noncommissioned officer (armed with a rifle), and automatic rifleman, a gas man armed with gas bombs and gas gun, and a sufficient quota of riflemen.

Interior guards should be maintained in accordance with regulations, walking in pairs if necessary. Headquarters and quarters of troops are occasionally bombed or dynamited from moving cars; it is, there-

fore, advisable to block off adjacent streets if possible. A strong reserve should be held available at the guard house, ready for immediate action, with reserve automotive equipment ready for a quick run.

It is frequently the case that civilians in a riot district believe that blank cartridges are used in firearms carried by guardsmen. The loading of pieces by patrols should be made in plain view. Blank ammunition should never be used for any purpose. Firearms should not be used except as a last resort, but when they are used, they should be used to kill. If machine guns and automatic rifles contain 10-15% tracer ammunition, it will do much to dispel the illusion that the pieces do not contain live bullets.

Every possible effort should be made to maintain cordial relations with the bulk of the civilian population. It is usually the case that a very small but noisy minority of the citizens are responsible for the trouble. The majority are ready and willing to cooperate with the troops, but are intimidated into silence. The importance of courtesy in dealing with civilians should be constantly impressed on the troops. The troop commander should be ready and willing to adjust any misunderstanding which might arise. Athletic contests should be arranged between National Guard teams and civilian groups, and all other means of throwing the military and civilian elements in a friendly way should be taken. Supplies should be purchased from as many local wholesalers as possible, so as to gain the friendship of influential merchants. Leaders on both sides of the dispute should be contacted by the troop commander and every effort made to obtain a settlement.

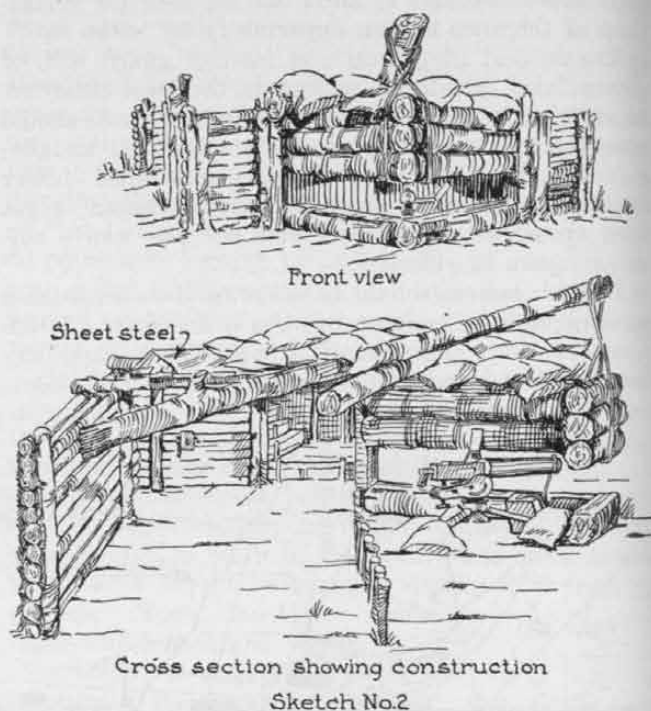


As observed above, it often happens that a portion of a company is sent outside of the town limits. The problems of the lieutenant or noncommissioned officer in charge of it are great. Everything that has been said before in this article will hold good in such a case, but the ways and means are often lacking. In the matter of sanitary facilities alone, troops stationed at a mine or some small hamlet amid a hostile population will encounter difficulties. But these difficulties must be overcome, and, as previously observed, arrangements should be made for the troops so stationed to alternate their duty with those in the more largely populated centers.

The tactical arrangements for isolated units are also difficult, and must be met differently in various situations. The units are frequently undermanned considering the amount of territory to be covered. However, troops should always be prepared for the worst contingencies. If ordered to prepare a position for defense, in the absence of contrary orders from higher authority, the same care and thoroughness should be required as though expecting the attack of an enemy in major warfare, as far as the time and facilities allow. It will entail much seemingly unnecessary work; it will arouse much grumbling; but if it saves the life of one soldier it will be well worth while. The tendency to be satisfied with defensive works scarcely able to resist a squirrel-rifle shot is certainly foolhardy in the extreme when it is a well-known fact that certain lawless elements are in possession of such dangerous playthings as "Tommy-Guns."

We will now discuss the subject of the Machine Gun in riot service. Although this weapon, fortunately, has never been used to a great extent in civil disturbances in this country, it is of tremendous importance because of its moral effect on lawless elements. It is purely a defensive weapon in riot duty, and should be actually fired only when fired upon or as a last resort after all else has failed. In towns and cities, the gun may be used within the exterior limits of a building which is being defended. It may be mounted on the back of a truck for patrol duty. It should always be in charge of an experienced machine gun officer. It should be carried and kept at the "half-load." The writer believes that its use should be so limited that the pistols of its crew should be brought into play before the gun itself in a crowded neighborhood. A machine gun is often assigned to support rifle units in the defense of an isolated area. Here its use is less restricted. For example, the first section of Company A, Xth Infantry, with 1st. Squad, Company D attached is assigned to protect the property of Big Lick Mine, and the lives of workmen and their families there. A public proclamation has been issued commanding trespassers to remain away from the mine property. Should persons disregard this warning they are evidently bent upon the destruction of life and property. Therefore, it is doubtful that innocent people would come within the path of well-directed machine gun fire. Sketch No. 1 shows distributions made in a case similar to that mentioned above.

Machine guns in detached posts should be mounted conspicuously on commanding ground. The position should be carefully constructed. A "T" base should be used. Sandbags and sheet-steel side and roof should be used for protection. The guns should be capable of traversing at least 270° and an all-around traverse is desirable when possible. Sketch No. 2 shows a machine gun nest so constructed that the roof-supports do not interfere with the field of fire. A range card should be compiled immediately upon occupation. A telephone should be installed connecting the post with headquarters, and the gun should not be fired except in grave emergency without the commanding officer's authorization. Because of the improbability of extended use, the necessity of having machine guns operate in pairs may be dispensed with. If dwellings lie within the probable path of fire, safety stakes should



Sketch No. 2
A permanent machine gun position as built by crew of gun no. 2. Construction allowing for traverse uninterrupted by supports. Note position of trail leg. Note quarters for relief crews. Note telephone on wall connecting with troop headquarters.

be carefully set, to eliminate the possibility of the gun firing in their direction. Two men should be at the gun position at all times, required to remain awake. They should be relieved at two-hour intervals. It is also highly important that a third man, armed with pistol or rifle, be posted some fifty yards away from the gun to protect its flank and rear from prowlers. The quarters of the relief crews should be as near the gun as possible.

The cleaning of the gun and equipment must be performed daily. Water must be drained from the jacket; ammunition cleaned and inspected. All working parts must be cleaned and oiled. The machine gun company commander should make frequent inspections of his

guns, range cards and equipment when they are scattered over outlying posts.

A brief outline of the uses to which other infantry weapons may be put will now be undertaken.

HOWITZER-COMPANY WEAPONS: Only when disturbed conditions take on the semblance of open, organized revolt, would these weapons be brought into play. The same suggestions made for machine guns with minor modifications would be applicable in their case.

GAS: Tear gas plays an important part in riot service. Trained gas men should accompany all patrols, and be stationed at all detached posts, with a reserve in the central town of the district. An amusing incident recently occurred. The unruly element was augmented from time to time by women who feeling that they would be immune from action on the part of the troops, would take liberties which the men would not dare. It so happened that two railroad detectives visited troop headquarters daily, and it was observed that any information given them in confidence was

quickly spread on the outside. The troop commander called the detectives aside one day, and, pledging them to secrecy, told them that the command had recently received a shipment of a new kind of gas which injured the features of anyone coming in contact with it. True to form, the word was passed among the disorderly element by the detectives. From that day on no woman ever appeared among the trouble-makers in that vicinity.

ARMORED CARS: This form of transportation is very helpful for patrolling, providing that the cars are in good mechanical condition and driven by trained men. Should the contrary be the case, they are best eliminated.

CONCLUSION: Duty of this type is always disagreeable. But, on the other hand, our National system of defense makes it the duty of the guardsman to be prepared at all times, and to function efficiently and intelligently when called. By so doing, he is rendering a service to his state and nation which is of paramount importance in their preservation.

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Men Make War; Men Must Fight It

By Lieutenant Colonel Bernard Lentz, Infantry

THAT men make war needs no discussion. It is universally accepted as a fact.

Men must fight the wars they make. This is a subject that enlists our interest and may, perhaps, be discussed with profit in connection with various schools of thought of which one hears from time to time. It is a subject that is as old as war itself. Time and time again as we scan the pages of history we find man, who makes the war, trying to discover some substitute for the human being in prosecuting the war but up-to-date it has always failed.

Let me cite an example to make clear what I have in mind. The great wall of China was built at enormous effort, the builders thereof having in mind that it would keep out the barbarian hordes from the North but it failed to do so because the men behind the wall failed.

A volume would be needed to express all the thoughts that have come down to us from men who knew war and who concluded that man must ever fight the wars that he makes. In a recent World War book, *The Storm of Steel*, by Ernest Junger, a man who was wounded many times, we read: "The security of a position depends on the freshness of its defenders and the fighting spirit, not on the length of the communication trenches, and the depth of the firing line." The same author also quotes: "Battles are won by iron hearts in wooden ships." During the war with Spain, we had a popular song entitled, "It's the man behind the gun that does the work."

Most of the talking and much of the teaching has been along the lines indicated above but some of the peace-time thinking has from time to time relegated man to "second fiddle," until war was again at hand and then the old truth, that man must fight the war, has always asserted itself with a vengeance.

Our own General Forrest said "War means fighting and fighting means killing." It is not a pleasant thought that war must ever take its toll of human life. Hope has sprung eternal in the human (but combative) breast that some day, somehow, great walls, catapults, elephants, tanks, airplanes and what-not would take the place of the human being. Under the "what-not" we may even include "speech making" for does not history record (I use the words of Guedalla) "What befell Athens when she could put forward no surer defense against Philip of Macedon than the most brilliant orations ever written in praise of freedom?"

At this time, I shall introduce, what I choose to call my text, taken from Byron's *Don Juan*. It will be recalled that at a certain point in the story, Don Juan, having escaped from the Turks with an Englishman as companion, applied for service with the Russians.

The Englishman being known to the Russian General had no difficulty in joining up but when it came to Don Juan the Russian General asked: "But, what can this young man do?" And the Englishman emphatically and ardently replied: "Why, General, if he hath no greater fault, in war, than love, he had better lead the assault."

With this fine recommendation Don Juan was readily accepted and he proved to be a great assaulter. He and some worthy comrades having used the bayonet with tremendous success during ensuing battles, Byron agreed that the Don Juan way was the correct way to win battles and added—to show how battles are often lost—the couplet of philosophy which shall constitute my text:

"They sometimes with a hankering for existence,
Keep merely firing at a foolish distance."

Quite recently there came to my attention some observations on war in the future, that fit into the discussion. To quote: "Military strength no longer depends directly on man power actually in training or of the trained reserve. Until quite recently the most sturdy and reliable soldiers were drawn from the agricultural population. However, if not today, at least in the near future, all civilians connected during peace times with machines and more particularly with such as can be immediately used in war—motor cars—trucks—busses—tractors—will form the main recruiting ground for armies."

I am inclined to agree with the above quoted observations "in principle" and in so doing I shall be more reciprocal than was Lloyd George of whom the late President Wilson said: "Lloyd George accepted, 'in principle,' everything that I advocated and then challenged every particular instance."

I shall simply make some reservations, for no thinking person could possibly be against great walls, catapults, elephants, trucks, busses, tractors, et cetera, (all in their proper period in history) as aids in fighting battles and in preserving human life. We need all the latest and best engines and accessories of war in abundance. The nation which neglects to keep abreast of the times with regard to inventions deserves to be defeated. There may, however, be danger that over-enthusiasm for first-rate implements and engines of war may bring about, as has been the case in the past, an under-supply of first-rate fighting men. This may result in the situation where second rate fighters (though they may be first rate technicians) "with a hankering for existence," will "keep merely firing at a foolish distance," and battles will be lost.

Here a reservation is appropriate to the effect that in wars, ten, a hundred or a thousand years hence not

only will the factories have to be combed for Don Juans but the agricultural population, as well, will have to be drawn upon for sufficient men who with or without all the latest machinery will subdue "a hankering for existence" in order that airplanes may not be "zooming," tanks may not be "grouching," and men in hob-nailed shoes, may not be firing "at a foolish distance."

And even when we have first-rate fighters manning first-rate tools, over-enthusiasm for the tools coupled with over-estimation of their powers, and great assiduity on the part of manufacturers to make profitable sales, may cause an over-supply of impedimenta—more than the first-rate fighter can handle—and that too may cause disaster.

Don Quixote de le Mancha was as valiant a fighter as has ever been brought to fame in prose or rhyme but he overloaded himself with arms and armament. By way of description of one of Don Quixote's many encounters (always without the least hankering for existence) we read: "Rosenante (his horse) fell and his Master lay rolling about the field for sometime endeavoring to rise, but in vain, so encumbered was he with his lance, target, spurs and helmet, added to the weight of his antiquated armor. A muleteer coming to him took the lance, which having broken to pieces, and applied one of the splinters with such agility upon Don Quixote that in spite of his armor he was threshed like wheat."

Here I make another reservation to the effect that overloading, even brave men, is bad enough on the offensive but when it comes to a retreat it is worse.

Armies do or must retreat sometimes. Washington retreated most of the time and he became the father of his country.

Wellington said, "The best test of a great general is to know when to retreat and to dare do it" and following his own advice he defeated Napoleon. The Duke remained all the while suspicious of new inventions (except his own—a combination sword—umbrella) alleged to revolutionize warfare. At one time, so Philip Guedalla recounts in a recent biography on Wellington, the Duke was persuaded to look at some new devices. One man had a new bayonet drill which, his author said, would make one Englishman the equal of twelve Frenchmen. Then there was an artificial hill to facilitate reconnaissance and a lens which would use the sun's rays to burn up the enemy. The Duke, "after having looked and listened with some impatience gave his orders for the day to the Adjutant General, mounted his horse and galloped to the trenches." This demonstration took place in the Peninsula. Some years later when it was learned that Napoleon had escaped from Elba, the Duke quickly rejoined the Army in Belgium. During his absence at Vienna, a rocket troop had been organized. The Duke saw it and, "ordered the rocket troop to store its cherished weapons and use ordinary guns instead and when someone urged that the change would break the captain's heart the implacable reply was 'Damn his heart, let my order be obeyed.'"

The Duke of Wellington was always a man to see for himself, which often involved danger to himself and his deep aversion to new inventions of war was, in all likelihood, due to his belief that gadgets might tend too much towards "firing at a foolish distance."

Was the Duke right? My answer is "Yes and No," which simply means that we should put our best thought on the acquisition of the latest, but useful, arms and armament remembering all the time that we must still have the right kind of human being lest, "with a hankering for existence," there be too much activity "at a foolish distance."

I think it is appropriate to inject a remark about cavalry. No matter how many kinds of mechanization we may develop and adopt, I consider the trained trooper, on and with his mount, constitutes an individual much like an infantryman on foot who can fight in places where nothing else can operate. Furthermore in a pinch the trooper can get off his horse and fight on foot. If we abandon the horse entirely we may in case of war, encounter terrain, situations and phases of battle where "for the want of a horse (other transportation being unable to get close enough) the battle was lost" because of too much "firing at a foolish distance." We may in the near future develop transportation that will go *everywhere* the horse, and even the man on foot, can go but until that happens, I think we should continue to be "from Missouri."

We come now to the matter of leadership in battle. Will personal leadership still be necessary in wars of the future? Will it be still advisable to keep everyone from general to private on the "expendable" roster even though we employ every modern means of communication?

Thomas G. Frothingham, in his *Washington; Commander-in-Chief*, gives us a good illustration of personal leadership which, with a little imagination, we may use to illustrate a point.

We all know that on the night of December 25, 1776, Washington crossed the Delaware. Frothingham tells us that with Washington, were such men as Generals Green, Mercer, Stirling, Sullivan, Stark and Knox. Other lower ranking officers were James Monroe and Alexander Hamilton. The plan had been that three detachments should cross the Delaware, at different points, but two of them presumably because of the snow and the ice and also lacking a Washington, never got started. Not so with Washington's band of 2,400 men. This force crossed in spite of snow and ice, surprised the Hessians at Trenton and won a victory of which Lord Germaine said: "All our hopes were blasted by the unhappy affair at Trenton."

Speaking of this affair, Frothingham says: "It would be difficult to find a parallel to this list of distinguished names in the roster of any military expedition of equal force." Is this not an illustration of the before-mentioned: "Battles are won by iron hearts in wooden ships?" I think it is.

Now let us assume the same situation and let us imagine that Washington on the morning of Decem-

ber 25, 1776, had been supplied with some up-to-date radio sets and that furthermore Washington had decided to exercise personal leadership by going "on the air." In line with other modern methods, we may imagine that Washington established his Command Post on the Pennsylvania side of the river, keeping a good share of the aforesaid distinguished men as staff officers. We can easily imagine a radio broadcast as follows:

"Stand by: General Washington speaking at C. P. (372.6—428.5, Penn.) I urge you forward with all haste. In spite of snow and ice; and cold and freezing; it is the earnest wish of the Commander-in-Chief and the Continental Congress that you take Trenton this night or I had rather that Martha Washington become a widow. General Washington signing off."

Does anyone believe that Trenton would have been taken? I don't.

I have let my imagination stretch pretty far, not to condemn modern means of communication, but to point out that personal leadership will probably still be needed in future wars. Wire lines and radio nets are important but too much exercising of leadership "over the wire" or "through the ether" may be like "sending a kiss by wire"—not very potent—and may engender too much activity, "at a foolish distance."

In this age of the specialist, who as some wit put it, "knows more and more about less and less," the military has also been motivated to fall into line. With all our arms, branches, bureaus and services we have been compelled to organize more or less into compartments and this is liable to make our thinking compartmental.

No matter how much the specialist tries to view a problem objectively, unwittingly he will act as did the forbear of a friend of mine. This friend visited the village of his ancestors in Canada. He went to the old churchyard where his great grandfather was buried between his two wives who had preceded him to the grave. This great grandfather according to family lore, when he was about to die requested: "Bury me between my two beloved wives Rachel and Anna, with my head leaning just a wee bit toward Rachel." In the same way, the specialist's Rachel is usually his own specialty.

Take for example the method—"indirect laying." A specialist may become so "hipped" about indirect laying that the result in war may be too much indirect laying—down on the job—which is the same thing as too much, "firing at a foolish distance." The consequence might be as suggested by a Chinese student at the Infantry School who having had an indirect laying chart explained to him observed: "By the time I get all this done a great big Jap he standing on top of me."

Perhaps I can elucidate further by telling of an informal visit I was directed to make to certain stations shortly after the World War, with a view to finding out how everybody was getting along. I began my visit at Department Headquarters. Here everything

was clicking, G's, technical and administrative staffs, clerks, orderlies, typewriters, ticklers on desks, rows of buzzer buttons, mimeographs, stacks of papers coming to the "in" baskets and other stacks being periodically removed from the "out" baskets. Everybody fully occupied. Morale excellent.

Next I went to the Camp Headquarters located in a large temporary building of a war-time cantonment. Here, too, I found everything going full steam ahead. Doing fine. They were so wrapped up in their work.

Then I proceeded in turn to a Brigade Headquarters and a Regimental Headquarters and I found full forces keeping busy and cheerful. Lastly, I went to a Battalion Headquarters where I found the battalion commander and his adjutant not doing much. They had plenty of time to talk to me. I finally asked the major: "How many men do you turn out for drill?" and he replied: "Why, we don't drill at all; by the time we get through furnishing men for clerks, orderlies and fatigue, there is nobody left for drill".

As explained above, this was shortly after the war: the outfit had recently returned from overseas and large numbers of men were being discharged. The situation was self-explanatory. We were demobilizing. But the incident does illustrate how *not* to organize for battle lest (and this may not be with a hankering for existence) there be too much activity "at a foolish distance".

It has at times been argued that it takes more ability to do staff work than it does to lead troops in battle. I shouldn't want to argue either way. I don't know enough about it. Both, I should say, require the best we can find. I do not believe, however, that staff work, even if it is more important, should be overglorified or the trend of the best ability may be too much toward command pos's and tactical, technical and administrative over-staffing, with its attendant specialization, may result in too much ability functioning "at a foolish distance".

Specialization, to which I have directly and indirectly devoted several paragraphs, does not help us toward what is needed more than anything else, viz: viewing problems as a whole—integrated thinking. Dr. John Dewey, our well known philosopher says on this score: "It is daily more evident that unless some *integration* can be attained, the always increasing isolations and oppositions consequent upon the growth of specialization in all fields, will in the end disrupt our civilization".

So I say, integrated military thinking (the kind of thinking that is done by "Generalists") which uses, but controls specialization and which is ever directed towards subduing "a hankering for existence" and discouraging, "firing at a foolish distance", will, as it has always done, go far by way of preparing us for future battles.

And finally, through integrated thinking, I feel, we are bound to conclude, as long as men persist in making war, that men, as always, will have to fight it.

Strategy

By Brigadier General Charles R. Howland, U. S. Army

IN THE study of a part of a subject it is of the utmost importance that the student should have at least a "bird's-eye view" of the whole subject in order that he may be coordinated in his study and in order that the result of his study may take its part in a harmonious whole. When this is not done we say the student "is looking at the trees and cannot see the woods."

So, a student of tactics or technique in the Army should begin his study by a sufficient consideration of the whole subject of Strategy, so that he can coordinate his tactical or technical idea with the strategical requirements that control the theoretical realm in which that idea is located.

It is desirable that strategy should be well understood before an important tactical or technical decision is made, in order that the maximum strategical advantage may be gained from such decision.

It is exceedingly important that a young officer just beginning his appreciation of his profession should approach his tactical or technical studies from the control background of strategy. If that system is used the young officer will not regard his tactical or technical requirements as something to be learned for future use, but rather he will regard them as something to be understood in a harmonious relation to the whole subject of Strategy. In order to gain that fine point of view it is not necessary that he should pursue a full course of study in strategy, but it is necessary that he should always have in mind a sufficiently clear outline or "bird's-eye view" of strategy so that his point of view on tactical or technical requirements will be harmonious with the strategical control idea.

The following is a very brief statement of the strategical control idea which may be called such a "bird's-eye view" of strategy:

Definitions

WAR: When the policies of two nations conflict and neither will abandon or change its policy, but instead continues its policy by the use of force, such use of force is war, so, war is that situation in which a nation attempts to impose its will upon another nation by the use of force.

DOCTRINE: A doctrine is a teaching of something that is believed to be right. A national policy is a doctrine. Our country has national policies and teaches them as doctrines. Examples—(1) "The Freedom of the Seas" (for the maintenance of which we fought the wars of 1804, 1812 and 1917). (2) "The Monroe Doctrine," which President Cleveland made effective in 1895 by insisting that the Venezuelan boundary

dispute be settled by arbitration. (3) "The Doctrine of Paramount Interest in the Caribbean Area" (for the maintenance of which we fought the war of 1898) and (4) the policy of the "Open Door in China," which is being maintained by diplomatic means.

A method (see *infra*) may become a national policy and taught as a doctrine. Example—Our country adheres to the Doctrine of the Strategical Defensive.

STRATEGY: Our word "Strategy" is derived from two Greek words, i.e., "Strategus" which meant the Commander-in-Chief in peace and war, and "Strategos" which meant the art of the General. So, "Strategy" means the art of the independent commander. An independent commander, however, may have no greater command than a squad or the personnel in a single airplane when on a strategic mission.

The best way to correctly express the exact meaning of the word "Strategy," after war is declared, is to use our modern phrase, "The conduct of war."

TACTICS: This definition of strategy permits the idea of "Tactics" to emerge as the science of a subordinate commander.

The strategist uses tactical combat by his subordinates to obtain strategical objectives.

Preparedness for War

Under modern conditions any nation that contains a rich market for world products, and does not adequately prepare for war, will lose its sovereignty through pacifism or defeat in war. Preparation in time of peace for war consists: in the maintenance of an adequate armed force for the protection of our sovereignty until the war plan force is ready for action, and in the preparation of *war plans* that will provide an armed force adequate to defeat any enemy that may attack us.

War Plans

It is a function of a war plan to visualize an approaching war and its nature, and to provide the force needed to protect us in that war. War plans should comply with the principles of "Information" and "Security" (see *infra*). A war plan outlines the area in which there may be operations. That area is called the "Theater of War." It divides the theater of war into two parts. The rear part in which personnel and supplies are gathered is called the "Zone of the Interior." The forward part in which the troops operate against the enemy is called the "Theater of Operations." Since the advent of navigation of the air, the theater of operations is much larger than was formerly the case. War plans use the Army and Navy each with its air corps to defend against attack on the land, on the sea, and in the air.

Declaration of War

The declaration of war on the recommendation of the Commander-in-Chief—the President—is made by the Congress under control of the “Principle of Public Opinion.” If public opinion demands war as in 1898, neither the President nor the Congress can prevent it. If public opinion does not want war, it will not be declared unless and until public opinion changes as in 1916 and 1917.

Mobilization

Immediately after the declaration of war, the President, i.e., the Commander-in-Chief, assigns a General to the command of the troops in the Theater of Operations, and directs the War Department to organize and operate the Zone of the Interior.

Principles

A principle is a fundamental truth. In strategy non-compliance with the fundamental requirements of a control principle is a grave error, by taking advantage of which the enemy may gain a great advantage. The following stated principles are the fundamental truths upon which strategy is founded, i.e., *Information, Supply, Objective, Mass, Maneuver, Security, and Morale*.

Principle of Information: In the conduct of war as well as in the conduct of all other activities, “one’s judgment cannot rise above one’s information of the situation.”

Some of the elements of every strategical situation are: *time, space, distance, terrain, climate, weather, relative strength, and resources of the contending forces, public opinion of the nations back of the contending forces, and public opinion of the neutral world*.

If definite values could be assigned to those elements in any situation, equations could be formed and a decision as to what to do could be reached by a mathematical process. But that cannot be done, as these elements are not constant in value. In fact no two situations have ever been exactly the same. So in order to arrive at a decision, something less must be used, i.e., an “Estimate of the Situation.”

The *information* for that estimate is gathered from written records, and from reconnaissance which is conducted very largely by the air corps.

The information ascertained is set forth in an orderly fashion in the “Estimate of the Situation.” A strategical estimate is much more difficult than a tactical estimate as the strategical estimate deduces the tactical mission.

The general who makes an estimate more nearly correct than his opponent is able to make the better decision and thus win a great advantage. The decision when made should be stated in language that is clear, forcible and brief.

Principle of Supply: Napoleon’s statement that a military force travels on its belly is truer today than ever before because the numbers are so great, and the equipment so complicated that such a force cannot function now unless the flow of supplies is continuous.

The method of insuring that steady supply is the use of a “Base of Supply” and “Lines of Communication.”

The distance of the “Base” to the rear must be beyond ordinary enemy activity and suitable for gathering supplies, and yet, the “Base” must be within transportation reach of the troops. The transportation lines from the “Base” to the troops are called “Lines of Communication.” All supplies go forward on them to the troops.

The supply capacity of the lines of communications in distance from the Base marks the maximum supply radius of activity for the troops, and the troops cannot advance beyond that limiting line.

The line of communications may be by sea, by river, by rail, by highway, or by air, or by any combination of those routes.

The relation between the Base, the Lines of Communication and the troops is exceedingly delicate and must be so regulated that operations are not embarrassed by shortage of supplies.

Principle of the Objective: Aimless effort gains nothing of value. It is necessary to have an objective for all activities in life. Operations in war without an objective would bring sure and rapid defeat.

It is necessary to select the objective before any operations are initiated, and before the supply system is installed.

If as a result of the estimate of the situation the commanding general decides to assume the offensive, his objective ordinarily would be the enemy force that threatens the greatest damage, and the defeat of which would most likely bring peace. There are three methods under this principle of operating against such an enemy force.

The *first* method is to operate directly against that enemy force.

The *second* method is to operate against the enemy Line of Communications, with the view of depriving the enemy of supplies, or, of forcing him to turn at a great disadvantage, to the defense of his Line of Communications.

The *third* method is to operate against the enemy Base, with the view of depriving the enemy of supplies, or, of forcing him to turn at a great disadvantage to the defense of his Base.

General Grant’s 1864 campaign illustrates the simultaneous use of all three methods, i.e., to destroy General Lee’s Army by using General Mead’s Army of the Potomac in battle against General Lee’s Army; by using General Crook’s operation from West Virginia against General Lee’s Line of Communications via Lynchburg to Knoxville, and by using General Sherman’s operation against Confederate resources farther south, which constituted General Lee’s Base.

If, on the other hand, the Commanding General decides to take the defensive, his objective ordinarily should be to delay and wear the enemy down with the view of seizing the initiative, pressing his advantage and assuming the offensive. General Washington’s strategical defensive in the campaign of 1777 against Lord Howe and General Clinton in the lower Hudson-New York-Philadelphia area and against General Bur-

goyne and General St. Leger in the Lake Champlain-upper Hudson-Mohawk River area, delayed the northern British force, wore it down, and permitted the American troops to seize the initiative, and even to assume a successful offensive against the forces of General St. Leger and General Burgoyne.

Principle of Mass: A mass is a properly led, trained and armed assemblage of troops. *Mobilization* is the first move toward the assembly of a mass, and concentration is the second move toward such an assembly. Strategic concentration leaves the mass at a point from which it begins the movement to battle. In relation to the enemy such concentration is called a *strategical deployment*.

There are two methods under this principle of strategical concentration. They are the Napoleonic concentration and the Von Moltken concentration.

The Napoleonic Concentration: In order to accomplish his strategical deployment advantageously, Bonaparte secretly concentrated his forces under cover of some great natural feature of the terrain, such as a forest, a mountain chain or a river. It is now difficult to conceal such a concentration from hostile air observation.

The Von Moltken concentration, named after Von Moltke Senior, locates the point of concentration on the battle field. Such a concentration may be defeated in detail.

The *original* mass concentrated at the beginning of a war cannot be maintained because of losses.

The *method* used to prevent unnecessary loss in that mass is called "Economy of Force."

Economy of force, in time, requires that troops will not be exposed to greater hardship or danger than is necessary, that the life, equipment, arms and armor of the troops will be so regulated as to reduce wastage to a minimum, and that the maximum number of sick and wounded be restored to health and returned to the mass for duty.

Economy of force, in space, requires that only the minimum demand shall be made on troops for detachments.

Such a mass and its detachments constitute a system called the *Mass Detachment System*.

In the mass detachment system every detachment has a time radius from the mass. Any detachment that cannot return to the mass in time to participate in the decisive operation is outside of that detachment time radius. Any detachment inside the detachment time radius should rejoin the mass in time to participate in the decisive operation unless it keeps a superior enemy force out of that operation. General Joseph E. Johnston, in command of a Confederate detachment, held a larger detachment of northern troops out of the First Battle of Bull Run, and still returned with his detachment to the Confederate mass and participated in its victory.

Economy of force in military energy requires that all plans, all orders, and all dispositions be made as simple as possible, that there be unity of command, and that cooperation be practiced in its simplest form.

Principle of Maneuver: It is not sufficient to merely assemble a mass. That would be inaction. If two combatants should merely assemble their masses nothing would happen. There must be maneuver to a contact if a decision is to be gained.

Strategy is charged with having all available forces at the decisive place at the decisive time and with using combat to attain the objective.

Defensive Maneuvers.

The position defensive if possible should have one and preferably both flanks resting on impassable obstacles. The maneuver should be continued with a view of inflicting great damage on the enemy, but should not be continued to a defeat.

When forced to retire, the maneuver of the *Retreating Defensive* which takes up successive positions and forces enemy deployments, or the maneuver of the *step by step defensive* which also takes up successive positions and holds them long enough to take a terrible toll from the enemy, are generally used.

The most effective maneuver is the *Sortie Defensive* in which the mass is assembled and operates offensively if and when the enemy uncovers weakness or makes a mistake.

The defense has peculiar maneuver advantages over the offense in that when defending on more than one front it can, by the use of interior lines, concentrate its mass on any one front and also in that the defense attracts the hostile forces to its front.

Offensive Maneuvers.

In offensive operations the strategical *objective* generally is to cut the hostile line of communications. When that is the objective the maneuver ordinarily is along a direction line.

The decisive direction line is the one which, if successfully followed, will accomplish the greatest progress toward the strategical objective. It may call for the turning of either or both flanks or a penetration through a weak point of the line.

Turning operations against enemies' flanks are called *converging operations*, while penetrating operations are called *diverging operations*, as after the penetration it is necessary to fold back hostile exposed flanks and gain a theater of operations between the separated hostile forces.

Principle of Security: It is axiomatic to say that before one combatant should undertake to impose his will upon another combatant, he should secure himself against just such an effort by his enemy.

The reward of security is the gaining of *Freedom of action*, under which a combatant can elect to defend or to attack his enemy.

Absolute security for freedom of action, demands frontier guards during mobilization, strategical covering force during concentration, strategical screen during maneuver, and protecting forces for strategical areas like capital cities, manufacturing centers, military bases and lines of communication.

Security is most surely gained by concentrating and maintaining a superior mass. This is true in peace to

prevent war, as surely as it is after war is declared to prevent defeat.

Principle of Morale: Napoleon's statement that morale factors count as three-fourths and materiel as only one-fourth in war, is correct, but under present-day conditions it is understated.

No arm or piece of equipment has ever been made or can be made by the human mind that can function in war apart from the human mind.

The personnel that make the war should be perfectly equipped, and armed and armored better than enemy troops. Such protection adds to morale and gives the human mind a still further reach for victory over the enemy. Reliance upon machines per se with which to make war instead of reliance upon the human mind is fatuous.

No matter how correct the plans or how complete the equipment or the preparation for war may be, that war cannot be successful unless the personnel are inspired by the spirit to dare everything and to do everything that will help to win the objective.

The spirit which is essential to success can and must be taught and troops can be carried to such a high belief in their powers that they rise above all ordinary hardships, snap their fingers at death and yearn for the battle field and its victory. That is the American way.

Methods

A *method* is a manner of doing anything.

There are but two strategical methods of conducting war. One is the offensive, the other is the defensive.

There are two kinds of offensive operations. The first kind is the offensive by maneuver along a direction line already described. The *second* kind is the *offensive of exhaustion*. That is used when the enemy is much weaker, and offensive operations along the whole front or on all fronts can be maintained simultaneously, thus preventing the enemy from using interior lines. General Grant used that offensive in 1864.

There are also two kinds of defensive operations. The first kind is the *active defensive by maneuver* which has already been described. The second kind is the *passive defense*, which does not undertake any offensive action whatever, but relies on *natural obstacles*, such as oceans, mountains, deserts, rivers and seasonal and weather conditions, on *artificial obstacles* such as fortresses, field works, trench lines, devastation

of terrain, and inundation, or secret sabotage of enemy resources and on arrival of reinforcements to attain its objective.

It is customary to teach that the passive defense has no value. That is not the fact. The truth is that a passive defense delays the making of peace and while the defense is still alive there is hope.

In 1812 the Russians, after failing to defeat Napoleon by an active military defense, forced Napoleon to retire from Moscow by destroying his base at Moscow by the passive defense method of sabotage.

The interplay of the offensive and the defensive has a life.

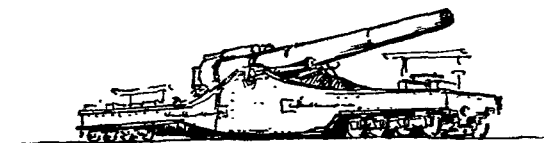
The offensive mass marches forth through obstacles against the defensive mass, the defensive mass awaits behind obstacles the coming of the offensive mass. As a result the loss of the offensive mass through fatigue, detachments and combat greatly exceeds that of the defensive mass, while the defensive mass, being in its home country and nearer to its base, can replace and build up strength more quickly than can the offensive mass.

When the offensive mass does not achieve quickly a decisive strategical victory, it will wane in strength, while the defensive mass will grow in strength. A time will come in the balancing of the two when the defensive mass will become the stronger. That time is called "The Point of Culmination." The most difficult of all strategical decisions is to determine the time of the "Point of Culmination."

During the life of the offensive and the defensive, each commander's best chance to gain freedom of action under the method of economy of force is to take his antagonist by surprise.

Surprise may be effected by time, strength or by direction of operation by the offensive; or by strength of defensive mass or its time or direction of maneuver, or by introduction of a new weapon by either the defensive or the offensive.

Everything considered, the offensive has the advantage when it is superior, due to a larger and better force, or to a better commander, or both. But it must be remembered that the ability of the commander has a greater reach for the victory than any other single element, and that in land warfare he cannot achieve the victory unless he has troops that can gain and hold ground.



Cavalry in Future War

By Colonel George Grunert, Cavalry

TO ENVISAGE cavalry of the future involves a study of its past, a knowledge of the trend of its present development and a picture of its role in future warfare.

It is not my aim to justify the continued existence of horse cavalry nor to advance arguments for or against mechanized cavalry. Both have their powers and limitations, and I am firmly convinced that the future will afford ample opportunity for the employment of both, singly or in combination.

What Is Cavalry?

To most laymen the term means "horse cavalry," while to the initiated it means "mounted troops possessing great mobility, varying degrees of dismounted firepower, and varying degrees of ability and tradition in the use of its mounts and weapons in mounted action." In the past, cavalry of European nations was developed for mounted action, depending principally upon shock in the employment of the horse, saber and lance, and had but little dismounted firepower. Our cavalry depended primarily upon its heavy dismounted firepower. Since the World War the trend of development is toward greater dismounted firepower without loss of mobility. Mechanization has added a new type of mount and the extent to which cavalry will become mechanized depends upon the extent to which machines can be utilized in the performance of cavalry missions. Thus, we may see that the term cavalry applies more to missions than to mounts and denotes mounted troops possessing great mobility, heavy dismounted firepower and ability to wage mounted combat under favorable conditions.

Summary of Cavalry History Prior to World War

2400 years ago, Philip of Macedon laid down principles that apply to warfare today; find your enemy, fix him, disrupt and demoralize him, and then annihilate him. His tactics were simple. The infantry Phalanx engaged and held the enemy, whilst the cavalry suppressed all resistance. Prior to his time, the tactical organization of military troops was based on the nature of the country rather than on any idea of weapon cooperation or the combined use of the various arms.

Philip's tactics were proved out and developed by his son, Alexander the Great. Under him cavalry became the decisive arm, and we find it so employed through succeeding centuries by such great leaders as Hannibal, Scipio, Gustavus Adolphus, Marlborough, Frederick the Great, Seydlitz, and Napoleon. At times its growth and progress were temporarily interrupted by its attempts to carry protective armour to withstand the improved bow and cross-bow, by the introduction of bombards and by the improvement in infantry and artillery weapons and tactics.

After the Napoleonic wars the development of small arms and artillery affected adversely the mounted assault of large bodies of cavalry against unshaken infantry, unless surprise was possible. The trend was shown in our Civil War, which introduced to the world what the Europeans called "mounted infantry," on account of its fire power; it was, however, real cavalry, modernized to meet changing conditions.

The cavalry lessons of this war should have prevented the disasters of the Austrian-Prussian War of 1866 and of the Franco-Prussian War of 1870-71.

In the years immediately preceding the World War, only the United States and Great Britain appear to have realized that the mobile fire power of the breech-loading rifle had now given the cavalry an effective arm of protection and thus extended its field of activity. French and German cavalry training was devoted mainly to reconnaissance duties and mounted action. Neither nation had fully realized the limitations imposed by the breech-loading rifle and the machine gun upon the possibilities of mounted assault against a dismounted enemy nor had recognized that, unless surprise and a short distance to cover were obtainable, he had first to be disorganized and demoralized by fire.

Cavalry During the World War

Mobile troops have great opportunities in the opening phase of any war. The consensus of opinion is that cavalry might have been more profitably employed by both sides on the Western Front prior to, and during, the Battle of the Marne.

Both Germany and France employed ten cavalry divisions without decisive results. The Germans placed five of their divisions in their center and left where there were no flanks and the country was unfavorable for cavalry action. Except in covering the concentration they were ineffective and soon became intermingled with foot troops. The remaining five were employed with their offensive right wing where there was an open flank and where the proper employment of all ten divisions might have changed the result of the whole campaign, but the faulty distribution of these five divisions and their subsequent poor tactics and lack of fire power caused them to miss many opportunities that might have contributed to decisive results, and on the whole their operations were ineffective. The expected inter-cavalry struggle never came about and after the failure of two of their divisions to over-run the Belgians at Haelen they seldom again attempted mounted assaults. At Le Cateau three divisions engaged in dismounted frontal assaults against the British II Corps thus sacrificing their mobility and failing to discover the Corps' exposed flanks and isolated position.

The initial disposition of the French cavalry was equally faulty. Only three divisions were placed on the exposed flank, where the terrain favored cavalry action, and these divisions soon became exhausted in the execution of minor, ineffective missions. The remaining seven divisions were distributed to armies operating on fronts where there were no flanks and where the terrain was not suited to mounted action. Not having been trained in dismounted action, they were ineffective and their mounted attacks, which they attempted regardless of the terrain and against unshaken opponents, proved futile and costly.

The British cavalry, having been trained for both mounted and dismounted action and having considerable dismounted fire power, was more effective, as was shown in their gallant and successful covering of the British advance to and withdrawal from Mons.

All three combatants utilized divisional cavalry and found it of great value.

Now as to questions. First take the German side.

1. Knowing the topography of the country, knowing that German cavalry had been trained to consider mounted action as its primary role; knowing that the main effort of the offensive was to be undertaken by the right wing; knowing that the main forces should be concentrated opposite the key point where the decision was to be sought; and knowing the difficulty of moving large masses of cavalry across Army areas: was the bulk of the German Cavalry concentrated in the proper area?

2. Knowing the foregoing and in addition thereto that Corps and Divisions had organic cavalry of its own (an average of 8 squadrons to a corps), was it necessary to attach cavalry divisions to armies of the center and the left wing?

3. Was not the initial concentration of the cavalry faulty?

4. Does it not appear logical to have concentrated the entire independent cavalry in the zone of the right wing (First, Second and Third Armies) and then to have employed it under one commander?

5. Could not such a cavalry mass with the available Jager battalions and cyclist companies and possibly some mobile long-range artillery have been employed as follows:

a. To cut the Belgians off from Antwerp? The available weak 2d German Cavalry Division couldn't do it.

b. By extension well to the right, to have struck the British Army at Mons in flank and rear and made its effect felt to the rear of the Fifth French Army?

c. For extended pursuit and to have made the stand of the Allied forces short of the river Seine impossible and jeopardized their stands on the Aisne and the Marne?

d. To have ridden around Paris and raided the S. O. S.?

e. To have kept the Sixth French Army from entering the Battle of the Marne? Only one weak cavalry division was available to attempt this.

Even the necessity of utilizing 4 cavalry divisions to fill the gap between the First and Second German

Armies would have left 6 divisions to strike the Sixth French Army in flank.

6. Does it not appear as though the German High Command failed to employ its cavalry to the best advantage and frittered away its strength and substance?

Now let us take the Allied side.

1. Was its cavalry properly concentrated strategically?

2. Was it properly employed?

3. With a proper knowledge of the terrain, the training of its cavalry, the principles governing concentrations, etc., should the French cavalry have been parceled out to the various armies? French corps and divisions had ample organic cavalry (6 squadrons per corps).

4. Would it not have been possible for the French after they were convinced that the Germans were coming in force through Belgium, to have massed the bulk of their independent cavalry northeast of the line Antwerp-Lille and attacked the German right flank?

5. Again, in preparation to resume the offensive could not the Allies have created a mass of French and British cavalry in the vicinity of Compiègne and, in conjunction with the attack of the Sixth French Army, have overrun the Landwehr and S. O. S. troops of the First German Army and continued on in the direction of Reims?

Now, in place of horse cavalry, substitute mechanized cavalry, or a combination of horse and mechanized cavalry, in the picture, and you can understand why I believe that cavalry has a most alluring future.

If space permitted I would picture to you similar examples of faulty concentration and employment of cavalry during the frontier battles on the Eastern Front and point out to you wherein the high command failed to make use of the terrain; failed to appreciate the powers of cavalry masses, when disposed opposite the point where a decision was sought; and frittered away cavalry strength by detachments to slow moving commands where cavalry lost its mobility and performed missions of divisional and corps cavalry, thus losing grand opportunities of a decisive nature.

On the other hand, I invite your study of the 1915 Roumanian Campaign, of the latter stages of the campaigns in Palestine and Mesopotamia, and of the Battle of Vittorio-Veneto; where you will find excellent examples of proper high command direction of cavalry and excellent leadership in the field.

The Trend of Cavalry Development Since the World War

The aftermath of the World War brought forth various opinions on the future of cavalry, but we find that, without exception, all the great leaders have expressed their confidence in the future of cavalry in no uncertain terms.

All nations having come to the conclusion that cavalry is not obsolete and realizing that its future missions will demand greater fire power, have sought to increase its fire power without a sacrifice of mobility. Some have added to the armament carried on

the horse, while others have provided additional fire power by means of accompanying mobile vehicles.

With the improvement in the cross-country maneuverability of the light tank, in the speed and dependability of the armored car and the progress made in perfecting a cross-country carrier, the leading nations, to varying degrees, have either incorporated them in their cavalry, or are experimenting with mechanized forces for ultimate use in conjunction with cavalry.

Again we see history repeating itself in an attempt by mounted forces to protect themselves from the increased dismounted fire power and we must guard against the loss of mobility through too great a desire for protection.

Of the leading nations of the world only Great Britain and France have conducted and are continuing to conduct extensive experiments in motorization and mechanization.

Some of Great Britain's tank enthusiasts brought on extensive experiments in mechanization, and for a time they predicted the abolition of horse cavalry and envisaged huge land fleets of heavy tanks followed by infantry in lorries and by self-propelled cross-country artillery and supported by light tank and armored car cavalry. Experiments, experience and expense brought them to a saner view, so now they have but 2 regiments of armored car cavalry and envisage the future of mechanization in the terms of light armored brigades working with the cavalry and medium armored brigades working with the infantry.

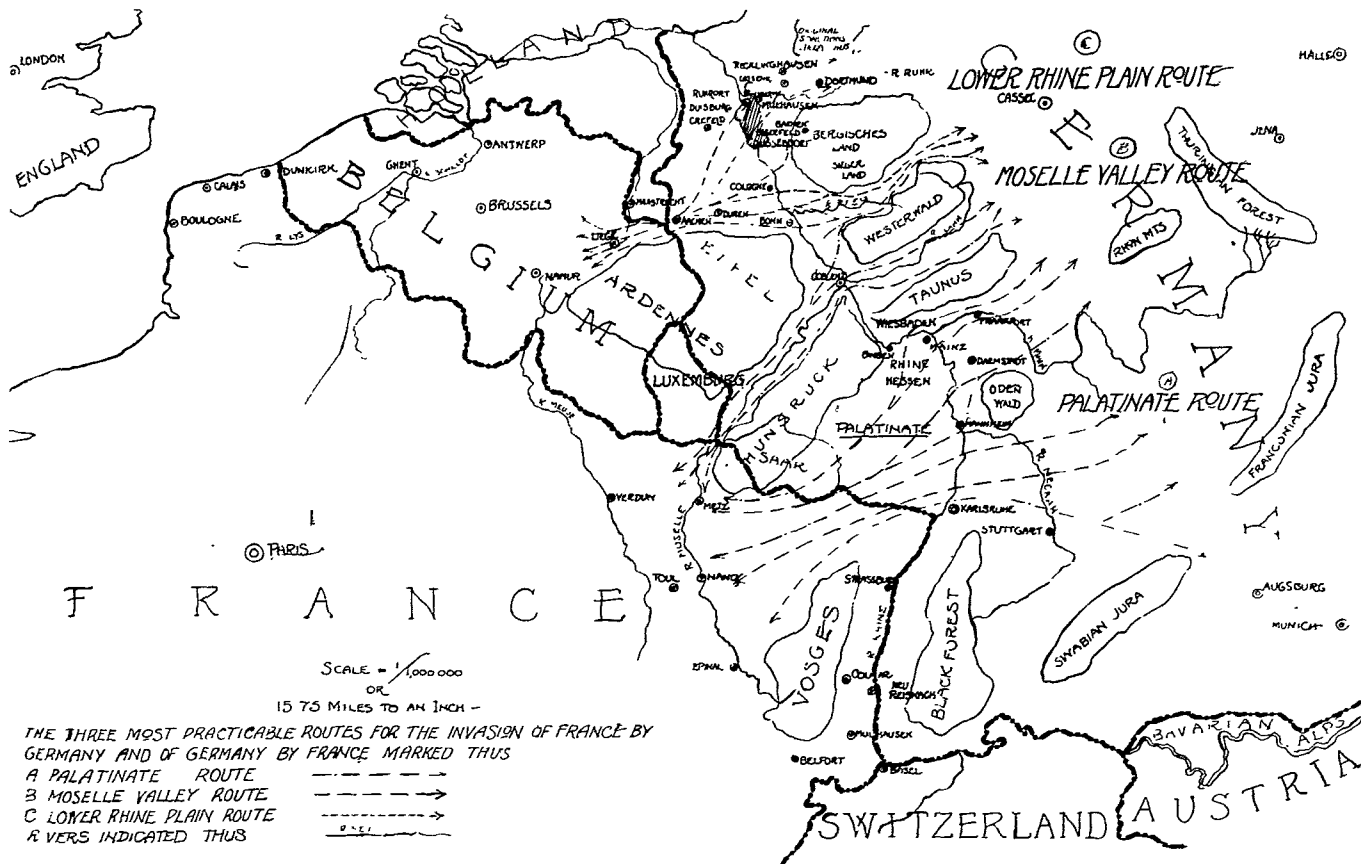
The French are now experimenting with mixed motorized and horse units. Their future program includes the motorization of certain cavalry regiments and of supporting arms, then the organization of a mechanized combat unit, and ultimately the mechanization of five cavalry divisions. The expense of their experiments and the rapid obsolescence of their vehicles may bring a downward revision of this ambitious program.

In our Army one cavalry regiment is being converted into a mechanized regiment, and the program calls for the mechanization of a second regiment with the object of eventually forming a mechanized brigade. However, at an initial cost of \$1,500,000.00 to mechanize a cavalry regiment, it is highly probable that our cavalry mechanization will be limited to that brigade for some time to come.

Our Cavalry carries with it, without loss of mobility, more actual fire power than does the cavalry of any other nation. France, the greatest advocate of fire power of all foreign nations, supplements the fire power of its horse cavalry by that of its *Dragons Portés*, but the combined fire power of its horse cavalry plus its *Dragons Portés* falls short of that of the American horse cavalry. Further, we carry 1,048 rifles per regiment to their 931 carbines per regiment.

Great Britain is the only other nation whose cavalry is armed with the rifle. The cavalry of other nations is armed with the carbine.

The United States and France, in their desire to give their cavalry the greatest fire power it can carry, or have transported for use with it, are seeking to



equip cavalry personnel with semi-automatic shoulder weapons. For the United States, this appears to be its next step in keeping ahead of the cavalry of other nations.

From the foregoing we see that the trend of cavalry development has been towards increased fire power, motorization and mechanization; all with the view to greater mobility and ability to protect itself and hold its own with the fire power and shock it may be subjected to.

From what we have seen there is every reason to conclude that cavalry of the future will be of two types—horse and mechanized, and that all the larger echelons of horse cavalry will have their motorized supply columns and a proportion of armored cars. Differences of opinion exist as to mixed formations of horse and mechanized cavalry and as to the eventual size of strictly mechanized cavalry formations.

Cavalry in Future Wars

1. The foregoing brief view of the present trend in the development of cavalry gives us an outline for our picture of its future. However, before coming to a conclusion as to cavalry in future wars, let us consider its powers and limitations and, by an analysis of its role, determine the kind of cavalry that would stand the best chance of successfully accomplishing its missions.

There is no need of my going into the powers and limitations of horse cavalry. History is replete with examples. On the other hand, a concise exposition of the powers and limitations of mechanized cavalry may assist us in keeping our feet on the ground, when we consider its future development and figure on its future employment. Let us carefully calculate future risks and not allow the imponderables to unduly sway our judgment, at least until we have exhaustively surveyed the field of ponderables.

Mobility, fire power and shock have ever been our cavalry's watchwords. Modern warfare demands of the cavalry increased mobility, increased fire power and shock action under favorable conditions. Our cavalry has greatly increased its fire power, without impairment of its mobility, but its shock action is now limited to its smaller formations. Mechanized cavalry should make for increased mobility and firepower and to a limited extent restore shock action. However, mere speed is not mobility, and no matter how rapidly a force may be able to arrive on the scene of action, it is of little value if it cannot maneuver and sustain itself.

The proposed mechanized cavalry regiment, consisting of a headquarters and a headquarters troop, a covering squadron (1 Armored Car troop and 1 Scout troop), a Combat Car squadron (2 Combat Car troops), and a Machine Gun troop, is a powerful organization with its 6 1.85 guns, its 155 cal. .30 machine guns, its 53 cal. .50 machine guns, and its 198 rifles.

Armored car squadrons are separate and distinct organizations. They consist of a headquarters and three troops. Each troop has three platoons, each of

which consists of 4 armored cars (each with a cal. .30 machine gun) and 1 cross-country car.

The favorable and unfavorable characteristics of armored and combat cars may be summed up as follows:

Favorable—Mobility, fire power, invulnerability, morale effect, and for combat cars—shock.

Unfavorable—Limited observation, easily discovered, draw fire, weight, breakdowns, fatigue of crews, difficulty of control (combat cars), and restricted mobility of armored cars, if wheeled.

To the unfavorable characteristics of both these classes of vehicles and applicable to mechanized units as a whole, the following may be added:

Length of road columns, difficulty of concealment and lack of suitable cover make them particularly vulnerable to air attacks.

A recent German invention of a small caliber armor-piercing bullet with a tremendous increase in muzzle velocity, may demand thicker armor and more weight in future mechanized vehicles.

The physical discomfort, fatigue and lack of vision react on crews and tend to make them timid.

The close support of armed men will usually be necessary to extend the field of action of mechanized vehicles, on account of the accidents of terrain and enemy obstacles, and to consolidate positions, mop up and exploit their successes.

Further, there will be restrictions due to mechanical and supply difficulties. Machines will be immobilized on account of breakdowns, accidents and lack of fuel, and their ability to "push on smartly" will have definite limitations, regardless of the morale of their crews or the determination of leaders.

Mechanized vehicles are complicated machines of special manufacture, with no commercial application. Their procurement will be slow and costly, and the spare parts supply a problem. Due to the rapid obsolescence of this costly equipment, peace-time assembly of large quantities thereof cannot be depended upon.

Considering these limitations: i.e., restricted tactical application, need for close ground support, and lack of mechanical ruggedness and dependability, precludes the organization of large units, wholly mechanized for the execution of independent missions or for the playing of separate combat roles.

Mechanized cavalry can supplement but not supplant horse cavalry.

Now let us consider the employment of cavalry and determine what kind of cavalry is best suited therefor:

We must always consider the cavalry of our possible enemies, its composition, organization and armament and, in connection therewith, the probable theaters of operations. Picture to yourself the difficult terrain in our own theaters: limited road nets, extensive wooded, watered and mountainous areas, sand, mud, etc. Then size up the theaters outside our borders and determine the kind of cavalry best suited to successfully accomplish cavalry missions. I have no doubt that you will arrive at the same conclusion that I reached, viz., that, with but few exceptions, these

theaters favor the employment of horse cavalry, supplemented by mechanized cavalry.

Generally, what are the missions of cavalry?

Now, as in the past, they are:

Before Battle:

- Long-distance strategical reconnaissance.
- Covering mobilization and concentration.
- Interrupting enemy's mobilization and concentration.
- Fighting for control of the theater of reconnaissance.
- Seizing points of strategical and tactical importance.
- Screening the advance of our own forces.
- Delaying the enemy's advance.
- Tactical reconnaissance.

During Battle:

- Cooperation in battle.
- Continued tactical reconnaissance.
- As an exploitation force, to take advantage of any break or weakened part in the hostile battle line.
- As a strategical or tactical reserve.

After Battle:

- Exploitation and pursuit.
- Cover a withdrawal.
- Continued tactical reconnaissance.
- Maintenance of contact with the enemy.

Generally, cavalry is employed as divisional, corps, and army cavalry.

Divisional cavalry should be attached only when and where needed, and then only in such formations as are absolutely necessary. In the past it was considered wasteful of cavalry strength to include a portion in the organic set-up of infantry divisions, although most foreign divisions included a squadron (corresponding to our troop) or more in their war organization, and their present peace organizations continue to include cavalry. The future will undoubtedly demand more active close-in reconnaissance to prevent surprise attacks by highly mobile forces, hence the increased necessity for divisional cavalry.

A squadron of horse cavalry, equipped with semi-automatic shoulder rifles, a platoon of machine guns and armed with weapons for defense against armored cars and light tanks, would seem most suitable as divisional cavalry to perform the required missions of close-in detailed reconnaissance and security, and at the same time constitute a mobile reserve for emergency use in closing small gaps, etc.

Mechanized cavalry is unable to properly comb the divisional zone because of the usually limited road net, and such use thereof would be a waste of its mobility and fire power.

Corps cavalry in its missions must cover a wider and deeper area; there is less need for a detailed reconnaissance of difficult terrain; and there usually is a better road net available. Further, it oftentimes must remain out of contact with supporting troops for a day or more. Hence, mechanized cavalry would appear to be more suitable than horse cavalry.

Army Cavalry. Most nations are now in accord with the view that the bulk of the cavalry should be kept together in independent mobile formations and that infantry corps and divisions should be given only so much cavalry as they absolutely need for their purposes.

Army cavalry should be organized into division and corps. Only strong formations can meet the operative problems connected with reconnaissance, security and actions against enemy flanks and rear.

The assignment of cavalry formations to armies should be predicated on a careful study of the terrain over which an army is to operate and its mission in the entire force employed.

In no other arm of the service does the error of splitting up a force manifest itself so much as in Army cavalry. The distribution everywhere of small cavalry formations gives up the initiative and from the start makes cavalry action dependent upon the enemy's action.

When cavalry corps are organized, the necessary auxiliaries for the performance of the missions assigned must be attached. These practically always include additional artillery and at times infantry in trucks. Every cavalry corps needs a motorized train.

Whether horse or mechanized cavalry or a combination thereof will be used depends primarily upon the terrain over which it is to operate and the availability of each.

Command and Leadership

Just a word as to the responsibility of high commands and staffs, which have so much to do with the success or failure of cavalry.

History is replete with examples of the misuse of cavalry; of a lack of understanding of its role and how to properly employ it, usually resulting in its distribution to subordinate commands; of its employment over unsuitable terrain or upon missions which can have no decisive results or which place it where it cannot later be used when badly needed; of the exhaustion of cavalry on minor missions, without a realization of its limitations; and of the failure to give it definite tasks and to keep it informed so that it may intelligently employ its means.

Commanders and staffs who fail to study their cavalry as they do their infantry and artillery, who fail to employ it to perform its allotted role, who fail to conserve its power for the opportune moment, and who fail to give it definite instructions; lose the value of one of the means furnished them with which to wage successful battle.

Now to summarize my conclusions as to cavalry in future wars.

As to our own country, I visualize our future cavalry as both horse and mechanized. At the outset, horse cavalry will predominate, and our mechanized cavalry undoubtedly will be limited to a single organized brigade, in addition to which there will be available a limited number of armored car units towards the project of furnishing each cavalry division with an armored car squadron.

Should funds be appropriated for more extensive cavalry mechanization, I would favor the organization of additional mechanized cavalry regiments at the rate of one for each cavalry division, not as an organic part of the division but available in GHQ reserve for attachment when and where needed. As such regiments become available, I would eliminate the tank company, now an organic part of the cavalry divisional organization. When not employed with cavalry divisions or cavalry corps, such regiments could be organized into mechanized cavalry brigades for employment independently, or in conjunction with horse cavalry formations.

The kind of cavalry that would be organized in any expansion of the cavalry arm, subsequent to our initial mobilization, depends upon the character of the terrain in the theater or theaters of operations. In 4 out of 5 of the most probable theaters, the demand for horse cavalry would predominate, and the proportion of horse to mechanized cavalry regiments would be at least 4 to 1.

There again, our cavalry expansion to a large extent may have to be governed by the kind and amount of cavalry which our enemy or enemies may put into the field.

Horse cavalry can be organized and trained more quickly than can mechanized cavalry.

Should we find a demand for mechanized cavalry that cannot be met by what we shall have or can produce by the time needed, we would be forced to substitute improvised motorized cavalry.

I am unable to visualize wholly mechanized or motorized armies on any future battlefields.

The employment of mechanized units and the extensive employment of armored cars in future warfare will make it necessary to provide infantry corps and divisions with adequate reconnaissance and security detachments, capable of operating at a greater distance from their main bodies than in the past. Thus the demand for divisional and corps cavalry will be insistent. When such cavalry is furnished, it is believed that a squadron of horse cavalry, with a platoon of machine guns and a platoon of antitank weapons, would most satisfactorily serve a division and that, as corps cavalry, a mechanized cavalry regiment (when available) or a horse cavalry regiment, with an armored car troop attached, would be most appropriate.

Where Army cavalry can be properly employed and the mission of the Army favors its employment, one or more cavalry divisions should be attached. The composition of such divisions to be substantially the same as now provided for, except when available and

when its proper employment can be foreseen, a mechanized regiment should be attached. When the Army cavalry missions require the employment of two or more cavalry divisions on the same mission or in the same locality, a cavalry corps should be organized.

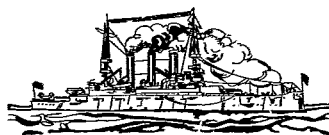
At each Army headquarters there should be a small cavalry staff which normally would look after the cavalry with the Army, conserve its strength and make plans for its most profitable future employment. At all times this staff should be ready to expand and function as a Cavalry Corps Staff in the event a cavalry corps is formed. If the command of such a Cavalry Corps is given to one of the Army cavalry division commanders, he should be physically separated from his division and not be permitted to occupy the dual position as a corps and a division commander. In organizing such a corps from cavalry divisions to which mechanized cavalry regiments are attached, the terrain or the mission of the corps might make it advisable to detach the mechanized regiments from the divisions and organize them into a mechanized brigade, or a separate mechanized brigade might be attached to the corps from GHQ reserve.

Similarly at GHQ, to whose reserve the bulk of the cavalry pertains until its most advantageous employment can be determined, there should be an organized cavalry staff available for assignment to a cavalry corps or a cavalry army, when large cavalry formations are to be employed independently, or are attached to other large formations. To command such large cavalry formations a major general should be available at GHQ.

The organization of such staffs at army and general headquarters would give commanders concerned the assistance so badly needed in conserving cavalry strength, keeping it well posted, in giving it adequate and definite instructions, and in planning ahead for its most profitable employment.

Cavalry missions have not changed, nor do I foresee any change in the future. The means at the cavalry's disposal for the accomplishment of such missions have changed and are subject to future changes. Greater mobility (limited at times by the terrain and road nets), a large increase in fire power, and the combat car as a shock weapon, have given the cavalry added means with which to accomplish its missions.

The terrain and, at times, the necessity for speed will govern the kind of cavalry to be employed. However, as a rule the best results will be obtained by the judicious employment of combined horse and mechanized cavalry in such formations as the magnitude of the task demands.



Ein Kriegspiel in Carlsbad

By Major A. J. French, CAC.

THE Corps Area Commander's formal tactical inspection of the 63d Coast Artillery this year consisted of a two-sided field exercise, or what the book calls a field maneuver. The infrequency of such exercises and their scarcity in proportion to the school problems involving antiaircraft artillery make it probable that a full and frank story of how this one actually worked out will be of interest to a considerable number of Coast Artillery officers.

The story will be told chronologically and, like a field order, begins with the information of the situation. We had early word that the inspection would involve a tactical problem and actual firing for both guns and machine guns, and that it would be held at a considerable distance from the home station. Naturally we were interested in knowing where. This question might have been turned over to S-2, but all the staff and most of the rest of the regiment took a try at it unofficially. When the itinerary for the inspection came along, time and space factors indicated that about fifteen to thirty minutes had been allowed between the conclusion of our inspection and the beginning of that of the San Diego Army and Navy Academy. Safety requirements for actual firing indicated that the location would be somewhere near the shore, so the conclusion was reached that we should probably be inspected in the general vicinity of Oceanside.

The regiment began its annual two weeks' field training period on March 2, camping for the first night at San Clemente. Camp being made early, it was suggested to battery commanders that their tactical education would be enhanced by reconnoitering for positions in the vicinity of Oceanside, to provide protection for the bridge over the San Luis Rey (this being the only feature which a fair imagination could conceive as requiring antiaircraft protection). No doubt it all served as valuable training, as did several problems solved later on the terrain in the vicinity of El Centro, but our estimate of the situation was dealt a fatal blow in the premises when the date for the tactical inspection of the 63d Coast Artillery and the 1st Bombardment Wing was set forward from April 24 to March 23-24, taking it entirely out of the itinerary upon which we had selected Oceanside as the probable location.

Speaking incidentally, it was while we were at El Centro that the earthquake of March 10 struck Long Beach and Compton. San Pedro also figured prominently in the first radio news flashes, and the early statements were so serious that it was decided to return without delay. This was at 8:10 p. m. At 9:15 the fast column, composed of prime movers and searchlights, got under way as an advance echelon,

moving with a state police escort and with the intention of pushing on the 250 odd miles without delay. The remainder of the regiment, not a man missing and the camp site well policed, was off by ten o'clock. Considering that a dance for the soldiers was about to begin in El Centro, and that the command was scattered from Mexicali, twelve miles south, to Brawley, twenty miles north, the start was prompt, to say the least.

Before proceeding far, however, a telephone communication had been received from Fort MacArthur that marines and sailors had landed, had the situation in the customary strangle hold, and that the 63d Coast Artillery would therefore camp at Indio and adhere to former schedule. This brought us to the scene of the temblor (that word should have been dragged in before) on March 14.

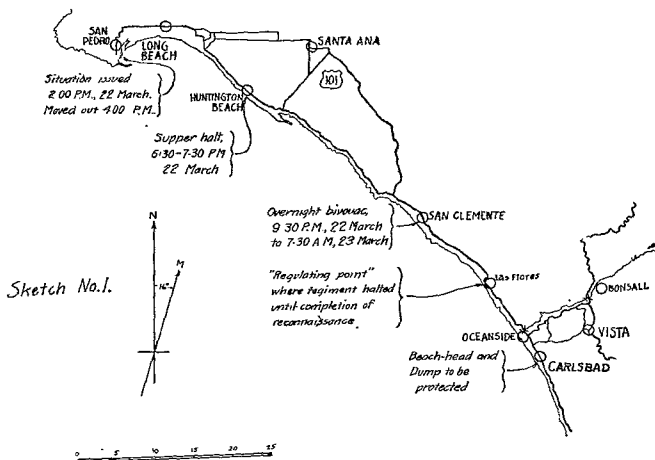
We may now return to the matter of the tactical inspection, but before the zero hour when we were to open sealed orders, we had time to consider that Corps Area orders had prescribed the setting aside of 60 rounds of 3-inch ammunition, 1600 rounds of .50 caliber, 2400 rounds of .30 caliber, 7 smoke candles and 7 tear candles out of the annual ammunition allowances for use at this tactical inspection.

Two other somewhat unusual features entered into our rather haphazard estimate of the situation (made before we were informed of it), the first being that our probable enemy, the Air Corps at March Field, had recently been equipped with bombers having speeds up to 200 miles per hour. The second grew out of correspondence and comments upon the tactical inspection of the year before, when an all-around protection had been required of our single gun battery, assisted by five searchlights, one modern sound locator and two hand controlled ones. It appeared possible that the problem this year would require us to defend with our active units only our proportionate sector, extended outward to cover a decisive zone suitable for bombers capable of high speeds and greater service ceilings. The methodical and forehanded regimental S-3, Captain Charley Ainsworth, constructed an overlay platen on this basis for preliminary map studies and reconnaissance.

The instructions and the situation issued at 2:00 P. M., March 22, required the regiment to occupy by 7:00 P. M., the next day, positions in a 120-degree sector generally north of Carlsbad for the protection of a beach-head and dump south of that place. The accompanying instructions were quite complete, covering all points upon which questions might arise. In fact, many of the points are a matter of routine, but it is well to err on the side of safety, and this set of instructions may well serve as a model.

The regimental commander decided to make a portion of the march that day, bivouac en route for a part of the night, then precede the regiment on reconnaissance early the next morning. A warning order to be prepared to march at 4:00 P. M., to San Clemente was issued about 2:15 P. M. At this time all vehicles were, in accordance with standing orders, gassed and serviced, officers' bedding rolls were at the batteries, as is more or less customary, but no other preparations had been permitted. Colonel Hilton, Harbor Defense Commander, offered to bet that the regiment would not get off on time, but everyone was too busy to hear him make the offer or to accept it when heard.

The distance to Carlsbad being 84 miles and the hour for occupation of positions not until 7:00 P. M. the next night, it might have been feasible to make the start next morning, if commanders and details, including all possible wire laying detachments, had started at once. This method, hastily considered, was rejected because it separated the command too long and too far. Its advantage would have been limited to that part of the command left behind to get a full night's sleep in barracks. Another alternative would have been to travel the whole distance without a bivouac halt. With two days of inspection following, it was considered wiser to give the troops some chance to rest.



Field Orders No. 3 for the march to San Clemente was signed at 3:55 P. M. and rushed to the head of Headquarters Battery column by Captain Greenwood, the commander of the slow column. The copy for the leading battery was handed to its commander just as it started to roll, for all the world like a piece of yellow flimsy which a railroad conductor hands to his engineer, and with the same promptness.

We promised to be frank at the beginning, and it is now time to confess to a couple of errors. The route through Long Beach was not our usual one, on account of the upheaval of March 10. Perris Avenue (on our map) has long since been changed to Santa Fe Avenue on the road signs, and Anaheim does not lead directly into U. S. Route 101. On this account, Headquarters Battery, which started so promptly and without the opportunity for any conference, got off the intended route and was missing at the supper halt in Hunting-

ton Beach.. The 48th Motor Repair Section which was attached to them for rations was provided with hamburgers procured locally by its commander, Captain J. E. Adamson, QMC, and no other harm was done, the missing battery being located in Santa Ana, and reverting to its regular place in column before arrival in San Clemente.

Upon arrival of the regimental commander and S-3 at San Clemente, the preparation of the orders for the following day was immediately begun. S-1, Lieutenant Walter Weible, had preceded the whole command in order to make arrangements for the use of a camp site, and to lay out camp. Very comfortable provisions for the regimental command post had been made by borrowing the use of the club rooms over the municipal pool of this Utopian community. In such surroundings it was decided to make the next order cover a march to a sort of regulating point, to direct reconnaissance by the battery commander, and to leave the order for occupation of positions for issue after the reconnaissance. The platen prepared by Captain Ainsworth was applied to the map, which showed what appeared to be suitable positions for all elements, including four observation posts on an arc five miles in advance of the outer searchlights. The separate mission assigned to the machine gun battery necessitated the selection of special locations for its two platoons.

The regulating point, or what the horse drawn artillery calls "last marker," was chosen at Las Flores, as this was the northern limit of the observation net, so as to avoid back tracking for any unit. This point was ten miles or more north of the objective. Under the order as written, battery commanders were at liberty to issue orders to their batteries to proceed farther south to locations nearer to their own northern elements before continuing on reconnaissance, and thus avoid all back tracking. Time was not so pressing in this problem as to make this point a vital factor; it was simply a matter of greatest convenience.

The light vehicles available to the regiment consist of two passenger cars and one motorcycle without sidecar. In order to permit some freedom of reconnaissance, officers and men were allowed to take along not to exceed three private cars per battery and a like number for regimental headquarters. There are enough who prefer to use their own cars so that no color of compulsion exists in the matter.

By the time Field Orders No. 4 was written and signed, the regiment was all in camp and asleep or trying to sleep in shelter tents and in the vehicles. The sergeant major did not rest until the field orders had been typed a second time so as to provide a full distribution. Recent custom in this regiment has rather favored the use of dictated orders, both for marches and for occupation of positions, but the instructions for this problem called for written copies of the orders issued, so formal written field orders were used in these two cases.

Came the dawn of March 23. The regimental commander, accompanied by S-3, proceeded on reconnais-

sance, moving via Oceanside, San Luis Rey, the unimproved road south thereof, Vista, Carlsbad, the stream crossing about one mile south of Carlsbad, and back to the point designated for the issue of further orders. En route they stopped, descended from their automobiles, and inspected the terrain for suitable positions for all five searchlights, the gun battery, and for two machine gun platoons, and visited the area designated as the site of the beach-head and dump to be protected. They arrived at the junction of Route 101 and Juniper Street, Carlsbad, at 9:10 a. m., and proceeded to make notes for the issue of the regimental commander's order.

Field Orders No. 5 was issued orally between 9:30 and 10:05 a. m. Yes, this is about 25 minutes longer than it usually takes to issue such an order. The additional time was taken up in a rather useless attempt to verify by precise mathematics the hasty estimates originally made to change the decisive zone from 200-mile bombers to 175-milers. All schools of tactics should properly denounce such interruptions, as commanders are all too prone to encroach unnecessarily on the time which their subordinates need for their own share of the work.

Paragraph five of the order provided for a special arrangement of wire laying, by having Headquarters Battery help Battery A in connecting two observation posts, and then relieving the former of its normal wire laying, by prescribing that Batteries B and E connect with regimental headquarters. While on this subject, it later turned out that the manager of Santa Margarita Ranch requested that wire be not laid through his herds of cattle to the observation post north of the ranch house, so a mobile radio set was despatched to that OP. It was estimated that a radio message could be received in one and a half minutes, or about a minute before a bomber could cover the same distance.

From the time of issuing this order until dark that evening the wire laying details were by long odds the busiest members of the regiment, and no one was loafing on the job. The order stated that communications should be laid by 6:00 p. m., but as the hour drew on it seemed doubtful that wire communications to the searchlights and observation posts would be established in time. The fact is that they were not completed by six o'clock, for the last was not connected until after half past six, but as this was in time for the requirements of the exercise, and as all lines tested through as soon as connected, this was considered reasonably satisfactory. Lieutenant McCarthy, commanding Battery A, asserted that he had laid 45 miles of wire, and as no one went around to pace it off just to prove he exaggerated, he should be given full credit. The wire laid by the other batteries would bring the total for the regiment very close to 80 miles.

While preparations were going forward for the occupation of positions and the establishment of communications for this phase of the situation, S-1 proceeded with the establishment of camp in a central

bivouac. The action was confined to two phases. Actual bivouac of troops in the vicinity of their positions was not required. As soon as the rear echelon of the regimental command post was established, the memorandum for the gun and machine gun firing on the following day was prepared and issued. Captain Bartlett and his lieutenants laid out, oriented and wired an altimetric base line. The calculations involved in the survey of this line kept them busy from the conclusion of the evening phase until two o'clock the next morning.

It was expected that the enemy air forces would come into our sector with many planes, simultaneously,

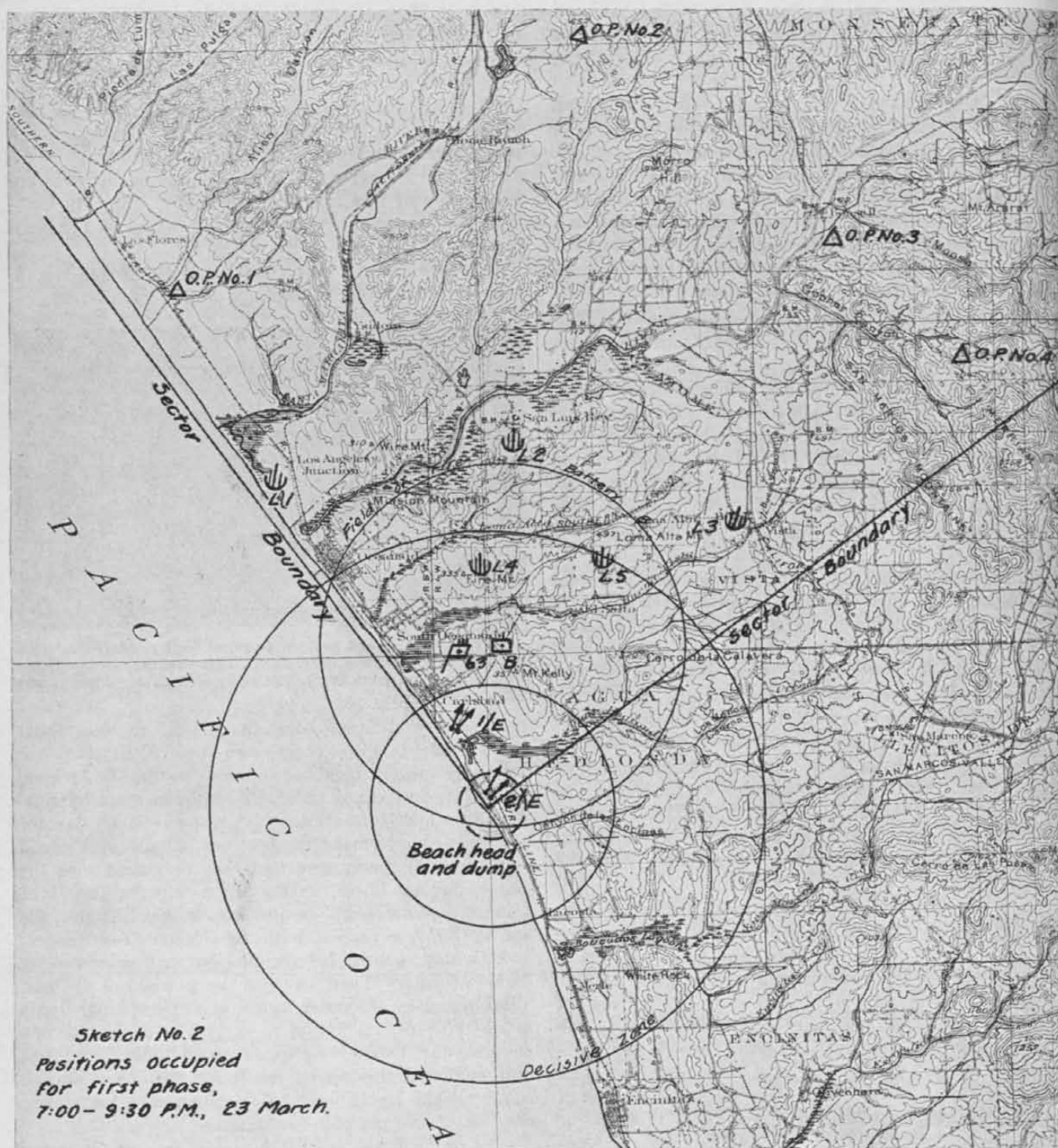


Battery B command post in Imperial Valley, March 8, 1933. Captain T. R. Bartlett, 63d C. A., Commanding, is conferring with First Lieutenant W. J. McCarthy, 63d C. A., Commanding Battery A.

from many different directions, and as frequently as consistent with their own safety in the air. Probably their bombing forces would be accompanied and screened from our sound locators by pursuit or attack formations, just to make it harder for us. In order to make the best use of our three sound locators, it was arranged that they be placed with the outer lights. These, acting upon reports from the listening posts, would be put into action in pairs, the center light, equipped with the electric control and comparator, acting in conjunction with either flank light in turn. Then as soon as a plane had been illuminated by the outer lights, one of the inner lights would be put into action to carry the target for one minute, the listener equipped outer lights would be put out, and the search continued for other planes. Thus all the lights were to operate under the closest control of the platoon commander.

The proof of the system lies in its results. Between 8:25 and 8:45 p. m. some eighteen bombers attacked the objective in the anticipated maneuvers, and of these five were picked up before they dropped their flares. Most of them were carried more than the minimum minute. The sky was overcast with scattered clouds at about two thousand feet, making it rather tricky to pass targets from the outer lights to the carrying lights, but with a few trials this difficulty was well mastered.

It would be too much to expect that such a system would work on such short notice without a hitch. Telephone communication to No. 3 light was so diffi-



cult as to be almost non-existent during most of the action, and this light followed the sound of planes well beyond the danger zone when it should have been searching for others coming in from the north. It was finally reached by relaying messages through another light on the same line. Moreover, the intelligence line between Battery A and the regimental command post was out, so that the regiment got no information from the three observation posts connected by wire, and the Searchlight Battery got none of the messages sent in from the OP at Rancho Santa

Margarita, which was using radio. This last feature was more of a handicap to the regimental intelligence section than to the searchlights, whose results on this exercise were better than those obtained in a very similar problem conducted at March Field last October upon conclusion of the battery's annual record practice.

At 9:05 p. m. Major B. C. Lockwood, Corps Area G-3, announced that the phase was ended, and the welcome order was given: "March order; pick up wire in the morning."

The hospitable townsfolk invited all and sundry to a dance at their very attractive hotel and promised to provide many comely maids and matrons. After the strenuous day and night preceding, however, very few of the command felt inclined to step out. The officers of Battery A, going to the hotel for a dinner which they didn't have time for before the battle, were induced to join the party and served as our social representatives.

The next morning positions were occupied for firing at towed targets. The Air Corps was given first chance to show its stuff, sending bombers and pursuit squadrons in impressive numbers against off shore targets representing ships engaged in landing operations. During this phase Battery E was subjected to a smoke cloud representing a gas attack, but as the breeze had shifted to the west, they were spared the actual tear gas prepared for them, out of consideration for the numerous civilian gallery, which included all the schools of the neighborhood and many passing motorists.

There was nothing particularly unusual in the subsequent firing of guns and machine guns at the towed sleeves, unless it be granted that it is unusual for this regiment not to bring down one or more targets. Several of the shrapnel bursts looked close enough for hits, but there was no damage done to the material target. The machine gun target was dropped in the ocean and not recovered. Anyhow, this started out to be a story of tactics and mobility.

The corps area representatives expressed themselves as very well pleased with the results of the tactical inspection, but were unable to stay for the critique, which was conducted by the District Commander, Colonel E. D'A. Pearce, assisted by his executive, Lieut. Colonel H. T. Burgin.

The close of the critique signalled the opening of the District Commander's tactical inspection, which involved a march on Fort MacArthur. Time and space factors worked out so that it was believed that commanders and details, by starting at once, could get to Fort MacArthur in time to complete a reconnaissance before dark. Then a night march by the batteries would bring them to their positions just about dawn. However, due to the exigencies of peace time



The author wears a gas mask for appearances; it is so becoming.

service and the necessity of recovering our wire, the march to new positions was actually postponed until the following day, March 25.

There was a complete absence of shipping off the coast at Carlsbad and no fog during our stay there. Oceanside has a well equipped emergency landing field, so now we are engaged in all the various details of a plan to move down there for target practice as soon as the Army Day celebration is out of the way. It may be appropriate, therefore, to close with a quip culled from the current issue of our regimental news and joke sheet:

New man in the 63d: "How long do we stay at this camp in Fort MacArthur?"

Native Son: "This is the stop where we keep our civies."



The Pen Is Mightier Than the Sword—Oh Yeah?

By Major Fred M. Green, Coast Artillery Corps

*Fifteen percent cut was bad enough,
But the pay-freeze made it three times as tough;
So for us poor suckers on D. O. L.
The present set-up is just plain hell.*

*There is no clause in an iron-clad lease
That takes account of your pay decrease,
So when you hint at reducing the rent
The landlord says "Not a God-damned cent."*

*So I tried to think of some simple way
Of supplementing my army pay;
And I thought, "When the Government breaks its
word,
Better live by the Pen than starve with the Sword."*

*Three hundred and sixty lines of verse
(Which were bad enough, but thank God no worse.)
I sent to the Publishing House of Gyp
To try and finance this Washington trip.*

*So Gyp he hands me a friendly line,
And prints the verses, and says they're fine.
But when it came to the author's check
That gave the author a pain in the neck!*

*Five paltry bucks for a work of art
That would even touch a Congressman's heart!
Free-running verse of the best design
For less than a cent-and-a-half a line!*

*Though you live on sausage and hash and stew,
And make your five-year-old uniforms "do,"
Of ready money there's never a sign,—
Except at a cent-and-a-half a line!*

*So I'm painfully learning, day by day,
That neither the Sword nor the Pen will pay;
For certainly wealth will never be mine
At the rate of a cent-and-a-half per line!*

*Reforestation might be the goods;
I think I'll apply for a job in the woods,
Where a busy summer spent swinging an axe
Might yield me enough for my income tax!*

L'ENVOI:

*For I'd quicker get riches by digging in ditches
Or setting out hemlock and pine,
Than by writing you verse, if you will not disburse
But a cent-and-a-half per line!*

East of Suez — Hong Kong

(The Impressions of an American Woman)

By Maida Davis Turtle

WITH scare headlines in box-car letters on the front page of every paper proclaiming the approach of Sun Yat Sen and the raging battles at the gates of Canton, we expected at least a little excitement in Hong Kong, only a few miles distant. We were bitterly disappointed—there was not even a breath of uneasiness. Hong Kong was as serene as a June morning, but far from as balmy.

Maps are deceptive things—I have a huge one of the world over which I pore feverishly every day or two, and according to this map, Hong Kong is in the same latitude—or is it longitude—as Havana, Honolulu and Calcutta, and just an inch farther north—on the map—than Manila. Now all these are good tropical places. Not so Hong Kong or Victoria, to give the city its real name. Coming up from the Philippines we felt that “Greenland’s icy mountains” had nothing on that fair island for climate. To be sure, it was January, and if a kind friend had not come nobly to the rescue with the loan of a fur coat, I, in my tropical wardrobe, would never have lived to tell the tale. In other words it was cold, unexpectedly cold.

Of course I haven’t seen Rio de Janeiro or Sydney or one or two other harbors famous for their beauty, though I’m getting around to them as quickly as possible, but so far, Hong Kong is second only to Honolulu and far more interesting. Against the blue, blue water and the bare brown hills of the mainland or the rugged green outline of the island are ships from every corner of the globe, flags flying. There are the finest Pacific liners anchored alongside clumsy Chinese junks; dozens of tiny sam-pans with their artistic sails darting about huge, weather-beaten freighters; a British war-vessel, silent and gray, anchored next to a festive private yacht of some rich Chinese merchant. Fascinating.

We woke up one morning just barely alive after two days and nights of serious mal de mer from Manila, looked out on the world and found it good. From the water one cannot believe that there are any but beautiful homes and imposing buildings on the entire island, they are so conveniently arranged up the mountain-side for inspection—for the island is really a mountain that got into the water by mistake. At the foot are grouped the government and business buildings, all arched and white and spacious. Just back of these, tier on tier reaching to the very summit above, are the most attractive looking homes ever, nestling in the greenest of green foliage and overhung with vines and trees.

To you who have disembarked only in American or European ports, landing is such a simple process as

to be unworthy of mention—you simply tip the servants to see to your baggage, powder your nose—or not, as the sex may be—and walk down the gang-plank to a good solid pier. Not so in Hong Kong. To be sure the Steam Ship Company has a launch which comes out with the avowed purpose of taking the passengers ashore. Usually, however, it arrives at the crack of dawn before said passengers have completed their toilets, and goes off without them, disdainfully chugging and switching its skirts in the water. Then if you are bound for a certain hotel, its launch may come out for you. I say “*may*” for if there is a bigger and more imposing ship arriving simultaneously with your more modest one, the hotel launch will pass you up, disregarding entirely your signals of distress. Then you are left to the mercy of the sam-pans. A sam-pan is a microscopic craft equipped with sails but usually propelled by one long oar wielded vigorously by a Chinese woman with a papoose strapped to her back. On this small boat the entire family lives, breathes and has its being. It is their home and on it are all their worldly goods consisting of a charcoal burner for cooking, a can in which to boil the rice, a bit of matting for a bed, the live-stock including any number of chickens tied by a leg to the mast for safe keeping, and last but not least, the children—which by the way, are not tied for safe keeping. There is no need of wardrobes or trunks—the wearing apparel is in use and from it you cannot tell the gender of the wearer; that is usually determined by whether or not there is a baby hanging to the back. But the thing that worries me a good deal about this floating population is the fact that they have no permanent addresses.

So, all else failing, that is the craft to which you must entrust not only yourself but all your baggage, light and heavy. And it isn’t as simple as it seems at that. By the time your courage is screwed up to the point of taking one, they are five deep from the steps out and you needs must climb from one to the other till the further-most one is reached. Then if you’re lucky, you land at a small dock, otherwise you—but why be morbid?

At the steps of the pier not more than fifty chattering Chinamen will fight over your bags and the same number will grab your trunks. You are not consulted in the matter at all. To the victor belongs the spoils and him you meekly follow to dozens of rickshaws where the same process is repeated. Then you tip the carrier of your bags and no matter how much you may give him there is invariably a murmuring for more, and he may even follow your rick-

shaw though he is secretly gratified at your extravagance. Your trunks trot right along with you hanging precariously from a bamboo pole carried on the shoulders of two coolies. Every minute you expect the rope to break and your heavy trunk to crack like ripe water-melons, but sure enough it doesn't and they don't. If you want to go to the peak, the rickshaws take you only to the first incline, there you disembark and another argument ensues when you pay. Sedan chairs are waiting and you climb in, knocking your hat off in the process for the top is always just exactly right for that. The front coolie grunts, the back one answers in kind, they lift the poles to calloused shoulders and up you go with the same motion as a small ship on the China Sea when it's rough. At the top of this path is the Peak tram-station—another wrangle when the chair coolies are paid. Thank goodness for a fixed and printed charge on the tram!

To the naked eye the cog railway up to the peak looks impossible. It goes straight up at a most alarming angle. At the intermediate stations the car is so nearly standing on its back wheels and the floor is such an incline, that the passengers climb laboriously to get out and look like distorted figures in the crazy-mirrors of a circus side-show.

More rickshaws are waiting at the peak to drive or pull or draw or take or whatever it is a rickshaw does for one, over the many concrete paths which surround the summit. Never was there a more perfect view—the harbor blue as indigo with hundreds of ships and snowy sails; countless small islands like green dots on the blue; miles of mainland with bare yellow-brown hills rising above Kowloon in such precision as to look exactly like a huge relief map; and then straight down from the peak through tropical foliage and winding roads bordered with beautiful homes to the water front with deep cool bays.

At the hotel in which we stayed—one of the best—the private baths are the most public ones I've ever seen—to be private. The building itself is very old and has been remodeled and added to so often that it resembles nothing in the world so much as a crazy quilt—a very comfortable crazy quilt. Each room has its own bath-room—sounds well—numbered to correspond. All I had to do to go to my ablutions was to cross a hall, wide and drafty, go down a flight of stairs, turn to the left, pass through another and narrower hall full to the brim of Chinese room-boys and there I was in my own private bath room! The tub was a delight—round and deep and beautifully carved on the outside and painted a violent green and not too smooth on the inside. One must needs be a boneless wonder to curl up sufficiently to get really damp.

China is a shopper's paradise and Hong Kong is no exception. The streets themselves are fascinating with the natives in their gay dress, the ever-present Indian traffic policemen tall and regal-looking and very colorful in their red turbans and uniforms faced with red, the cosmopolitan crowds on the side walks, the soft barefoot patter of the rickshaw coolies on the

pavements and their cheerful cries of warning to the pedestrians. Shopping however is an anguish—every shop is so alluring and so cram-full of works of art, each so beautiful by itself and such a baffling ensemble—rich ivory, exquisitely carved; luscious silks, heavily embroidered; fine linens, made priceless by intricate hand-work; beads and ear-rings and pins and bracelets of cool jade or rich amber or pure crystal; tea-sets and vases and bowls; pewter, silver, teak-wood, cloisonne, brass, satsuma; and every thing of a cheapness that makes the westerner completely lose his head and pay three times the real value. One must never pay the first price asked—it really isn't done—and the clever shopper usually gets things for less than half. I have bargained so much that I have visions of going into a Fifth Avenue shop and bringing the scorn of some supercilious saleslady down upon my defenseless head.

One place is called Flower Street and there are booths one after another where the most beautiful blossoms can be had for a song—or maybe just a verse and chorus if you understand. But they are so cheap at first price and so irresistible that no one haggles over a thing so mundane as the cost. After months of tropical flowers, more or less coarse, roses and violets and chrysanthemums are like a message from home.

A tourist must be a fortune teller or at least a Sherlock Holmes to tell a funeral from a wedding and to extract information from the blasé inhabitant is simply out of the question. In south China it seems that red is the color alike for mourning and weddings, so when I saw a highly colored procession going through the streets I looked closely for a coffin. When that was not forthcoming I scrutinized the paraders for the happy couple—in vain. There were poles covered with tinsel and gewgaws all the same as our Christmas tree ornaments, glass cases of wax figures and artificial flowers, banners and gaily-bedecked sedan chairs that glittered in the sun. At the head of this colorful parade was a native band playing American jazz! By the process of elimination I decided that this must be a wedding for the next day we saw precisely the same sort of ceremony except that in front of the band were half a dozen paid mourners dressed in long white robes and cowls, wailing loudly. It seems that the louder they wail the more money they're worth. In this case they must have been highly paid and in addition the musicians were playing with telling effect "The Girl I Left Behind Me!"

Cemeteries are always built on rolling ground and are very spacious. Each grave is dug into the side of the hill and looks like nothing so much as a huge white lock, the aperture for the coffin forming the key hole. From a distance the effect is striking and does not have that gloomy appearance of our own more solemn head stones.

Our British cousins have certainly "done themselves proud" by building wonderful drive-ways around the island—these are all very beautiful besides being real feats of engineering skill. Through hedges of lacey

bamboo, up hills, down into green valleys, with now a glimpse of tree covered peaks and now of the blue waters dotted with picturesque sails, the main road finally leads to the perfect bay, and there built on the brow of a hill with a marvelous view of the water is Repulse Bay Hotel. On either side of broad white steps are masses of flaming nasturtiums and beds and beds of orange zenias whose color is repeated in the trumpet vines on trellises and fences heavy with the vivid flowers. And there on the drive-way at the entrance is the only sign of its kind I have even seen: "Beware of Pedestrians".

Not even when the visitor is safely aboard his ship is he free from the temptation to buy, for sam-pan mer-

chants cluster around to the last minute. Among the deck-passengers on our boat there were many Indians, and one sam-pan, full of straw mats and china bowls, did a land office business with them. The seller would unroll his rugs of violet colors, the Hindoos on deck would inspect, conversation would ensue, a rope let down and the chosen mat pulled up. Then the purchaser would tie on a basket and let down his money—if it were not the proper amount more conversation would be indulged in, up would go the basket and the bargain would be completed. Not until the anchor had been "heaved" and the steps pulled up to the lulling, musical chant of the coolies did the trade-boats call it a day and cast off. A persistent people, the Chinese.

Another Coast Artillery Song

Who's Who in the Army

By 1st Lieut. Chas. G. Overton, 971st C. A. (AA)

*The doughboys drill along the road
The Engineer has made.
The Cavalry scouts for a foe,
The Staff sits in the shade.*

*The Surgeons all are on a strike,
Discharged the army Nurse.
For lack of duty in their line,
Coast Artillery they curse.*

*The Signal Corps wires back to Base,
"No foreign planes we see,
No alien ship gets near our land,
Thank Coast Artillery".*

*There are no duties to perform,
Just exercise and eat,
The Coast Artillery destroys
Each air invading fleet.*

*With active guard along the Coast
No danger can there be.
Then three cheers for the men who are
The Coast Artillery.*

Computation of Scores for Seacoast Artillery Target Practice in the National Guard and Regular Army

THE letter of instruction for the conduct of artillery target practice issued by the War Department in April, 1932, prescribed a method to be employed in the computation of scores in seacoast artillery firing conducted by National Guard organizations. This method differed in certain essentials from the methods previously employed. The change was brought about by a desire to reduce the keeping of records to a minimum and to make the work of computing the score as simple and easy as possible. Usually the annual target practice of National Guard units is held very near the end of the two weeks encampment. Following the return to their homes, the officer personnel is frequently widely scattered, therefore, it would be difficult for them to devote the time and attention necessary to compute the scores using the system prescribed for the Regular Army.

In the National Guard system of scoring two factors only are considered in the computation, *i. e.*, time and accuracy. The hypothetical target prescribed is a rectangle whose outside dimensions equal eight probable errors for both range and deflection; inside of this are three smaller rectangles, the material target being considered as located at the center. Shots falling within the different rectangles are given arbitrary values of 5, 4, 3 and 2 respectively, starting from the center or smallest rectangle. The score resulting from this method was intended to furnish data on how well the battery was adjusted with reference to a point without regard to a particular type or shape of target. It is easy to see that a most excellent target practice, with the shots well grouped, might result in a low score, assuming that the center of impact happened to fall within the limits of the outer rectangle or zone, say three range or deflection probable errors from the center.

The method of scoring as applied to the Regular Army is an attempt to answer the question of how well the firing would have been conducted on a particular type of ship. Introduced into the formula are several other factors such as rate of travel of target and angle of presentation, also a penalty is imposed for gross personnel errors. The two methods of arriving at a final score being quite different it is only natural that the result will not be the same even though the identical data be used in making the computation.

In one instance which has come to our attention the National Guard instructor took the data for two particular batteries and computed the scores by both the National Guard and the Regular Army method. The results were surprising. We will call the batteries "A"

and "B." Under the National Guard system, A's score was 90.2 while B's was 92.8. Using exactly the same data but computing the score under the Regular Army system—A's score was 110.2 while B's was 74.9. This led to the conclusion that something is wrong with the system, or to say the least, it is inconsistent. Theoretically this is not due to the scoring formula since the varying probabilities of hitting should compensate for the difference. The contention raised by this instructor is to the effect that one system *must be faulty, both may be faulty but both cannot be correct*. His argument is not without merit. In theory both methods of scoring should give approximately the same result when the center of impact is adjusted on the center of the target. Nothing is infallible. After all, scores afford a doubtful means of comparison but the Coast Artillery has been compelled to use them because of inability to develop anything better. The vagaries of chance affect the situation too greatly and render it impracticable to draw definite and accurate conclusions. One system of scoring emphasizes certain features of the game whereas the other system emphasizes other features. It is not even certain which method of scoring is the more accurate in the long run. Many believe that the National Guard system is superior in accuracy, considering the limited amount of ammunition, to that of the Regular Army and they are not without arguments in their favor. It is believed that the National Guard method of computing a score is desirable for its simplicity. After all it does provide a means of comparison between the batteries using this method. In general this comparison is reasonably accurate. Any change made which materially alters either method will lead to greater difficulties than are now presented. It is possible that at some time there will be developed a better method of scoring but until that is accomplished we are compelled to continue to use the methods now prescribed. Commenting on this point the National Guard instructor above referred to stated as follows:

"I believe a better method of scoring is desirable but I am not prepared to recommend anything better than the system employed by the Regular Army and that was departed from in order to avoid keeping target practice records. So far as we are concerned we keep the records just the same and analyze them for our own benefit."

Perhaps other instructors may have developed some ideas on this subject. If so, the JOURNAL would be glad to have them; they may contain the germ of a system which will develop to a point where it will be satisfactory to all concerned.

COAST ARTILLERY BOARD NOTES

Any individual, whether or not he is a member of the service, is invited to submit constructive suggestions relating to problems under study by the Coast Artillery Board, or to present any new problems that properly may be considered by the Board. Communications should be addressed to the President, Coast Artillery Board, Fort Monroe, Virginia.

THE COAST ARTILLERY BOARD

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CAPTAIN J. T. LEWIS, C.A.C.

1. Lewis-Trichel Seacoast Director.—Perhaps the most important development work now in progress is that on the new Seacoast Director being built under the supervision of the Coast Artillery Board by Captain J. T. Lewis, C. A. C., assisted by Lieutenant G. W. Trichel, C. A. C. This has not yet been taken up as a numbered project, but will be so taken up when the official tests of the device are undertaken. This director was conceived by Captain Lewis about two years ago. The method of solution of the problem differs radically from that used in any other director either seacoast or antiaircraft. In order to establish the practicability of the solution, an original experimental model was built at Fort Monroe. This model, lacking in many refinements, was an assembly of parts built in the Coast Artillery School machine shop or taken from obsolete antiaircraft directors. This first model was given thorough tracking tests over a period of about two weeks. The results of these tests were most gratifying. The theories involved and the mechanical practicability of the solution were apparently thoroughly proved, at least as far as was possible with an experimental model. The next step was to prepare a design for a complete model to be built from the ground up as a seacoast director. It was originally thought that such model might be built at Frankford Arsenal. However, there were several important details not yet determined upon and it was decided that the most practicable procedure would be to design and build the new model completely at Fort Monroe. The Chief of Ordnance generously directed the loan of an expert lay-out designer from Frankford Arsenal and also arranged for the construction of certain machine parts at that place. The design and construction work have proceeded on schedule. It is expected that the new model will be completely assembled in May, 1933. Tests of the device will, of course, proceed immediately upon completion of assembly. Great hope is held for this device. The comparative simplicity and expected reasonable cost of construction are features which lead to the hope that, if the device is successful, it may be obtained in quantities sufficient to supply the service in general.

2. Machine Gun Fire Control.—Another important

problem receiving serious study by the Coast Artillery Board is that of a satisfactory fire control system for antiaircraft machine guns. This problem has been studied for many years by officers thoroughly familiar with the requirements. To date, however, no real solution has been offered. The problem is extremely difficult. The time during which a machine gun target will be within range is measured in seconds. Rapid operation, with a fair degree of accuracy are the prime requisites of any device for computing and applying firing data in this case. As is known, tracer control offers a satisfactory solution for ranges up to six or seven hundred yards but beyond those ranges tracers seem to be of little assistance. It has been found almost impossible to determine by eye at the longer ranges what part of the trace of the projectile is at the range of the target. The two-colored tracer was developed in the hope that the change of color occurring at a definite range would offer assistance in adjusting fire. No great success has resulted from this scheme. Apparently the ultimate solution will include some method of spotting or of determining where the shots are going with respect to the target. Experience has indicated that even when the firing data is computed by the most accurate director yet developed, the ballistic conditions of the moment may be such as to nullify the advantage of such accurate computations. Though the problem is admittedly difficult, it is felt that every effort should be made to solve it. Present methods are not satisfactory. Constructive suggestions will be welcomed.

Projects Completed During March-April, 1933

No. 800—Test of Radio Direction Finders.—Two types of radio direction finders, similar to the direction finders installed along the coast line to aid a navigator in determining his location, listed as the SCR-173 and the ER 1445-B, were tested by the Coast Artillery during the long range firings in Hawaii. These direction finders were used to locate an airplane at the instant the plane reported by radio the range and azimuth of target from the plane. The

plane was not visible from the battery. Sufficiently good results were obtained to warrant continued experiments with radio direction finders, but neither type tested was satisfactory in its present condition. The Coast Artillery Board recommended that the ER 1445-B Radio Direction Finder (Marine Compass) be further developed with a view to increasing its accuracy and that this development be given a high priority. The Coast Artillery Board will make further tests of the radio direction finder as soon as an improved device is submitted.

No. 939—Blast Shields for Barbette Carriage, M1917.—Blast shields were originally provided on the M1917 carriages as protection to the gun pointer in Case II fire. The shields are installed on several carriages that are not sited for Case II fire. When Case III fire is employed, the shield affords some protection to the range setter and to the man who operates the firing magneto. When using the newly adopted azimuth pointer which is to be installed on the upper platform, the azimuth setter also will operate from a position directly in rear of the blast shield. The shield as installed is in his line of vision and the setting of azimuth would be considerably facilitated if the blast shield were removed. Based on this fact and other reports that the blast shields were ineffective, it was believed desirable to ascertain the truth as to the protection afforded. Letters were addressed to the commanding officers of all corps areas in which these model guns were located, requesting information on the effectiveness of the blast shields. Reports were not conclusive. Some indicated that the shields offered good protection while others indicated that the shields made the blast effect even worse for persons behind the shield. As a result, the Coast Artillery Board recommended that:

- a. Existing blast shields be retained,
 - b. No additional blast shields of the present design be installed on the 12-inch barbette carriage guns not now provided with shields, and
 - c. The question of the design of a more effective blast shield be deferred until a later date.
- In this connection, it might be stated that, in Project No. 871, the Coast Artillery Board recommended that azimuth pointers be installed on the upper platform. A corollary to this was the recommendation to cut a hole in each blast shield already installed to permit the azimuth setter to see the pointer.

No. 950—Test of Adlake and Yankee Tail Lights for Use with Aiming Post M1.—The development of a night aiming point for use with tractor artillery has been under consideration by the Coast Artillery Board for a number of years. The idea of using an electric light was abandoned since such an installation would require long wiring circuits or the supply of a number of storage batteries either of which would be difficult to transport and maintain in the field. It was believed desirable to use an oil burning light which could be used for other purposes in addition to serving as an aiming point. There were two types of lanterns in use in tractor drawn batteries; namely, the Artillery Lantern M1, and the oil burn-

ing tail lights furnished with certain types of trucks and trailers. The Artillery Lantern M1, supplied with a special mask, was tested and found unsatisfactory. This was due to the fact that when the slit in the mask was faced towards the gun, the light was too bright and did not give a suitable aiming point. It could not be dimmed or turned to afford a suitable aiming point under all conditions. The types of oil burning tail lamps in use in the Coast Artillery are known as the "Adlake" and "Yankee." These are normally equipped with a red lens forming a bull's-eye. It was found that both types were suitable as aiming points without a mask since it was possible for the gun pointer to bisect a circular bull's-eye. To obviate confusion to a gun pointer in quickly getting on his own aiming light, it was proposed that the aiming lights for adjacent guns alternate with red and green lenses. Standard tail lights with red lenses are to be used with an extra green lens for each two lights. After the first test of these tail lights, the Coast Artillery Board recommended that an adapter be supplied to attach the light to the aiming post M1. The lamps were then given additional tests as a result of which the Coast Artillery Board recommended that:

- a. The Chief of Ordnance be requested to modify the carrying chest,
- b. Four extra green lenses (quickly interchangeable with the red ones) be supplied for each 155 mm. gun battery,
- c. When modified, the aiming light assembly, consisting of a chest, two adapters, two tail lights and one extra green lens, be adopted as standard and be issued on the basis of one assembly per 155 mm. gun, and
- d. The chest containing the aiming lights not be attached to any vehicle but be carried in the transom seat of the gun.

No. 951—Proposed Instructions and Prescribed Ammunition Allowances for Coast Artillery Target Practices, Fiscal Year 1934.—The annual letter of instructions for Coast Artillery target practices, now called Training Memorandum No. 1, was prepared by the Coast Artillery Board and submitted to the Chief of Coast Artillery. This memorandum contains some of the provisions incorporated in the proposed revision of TR 435-55. Among the changes made in the new memorandum were the following:

- a. New Table I, probable errors for mortars (probable error is taken as constant throughout each zone). This change was made to simplify computation.
- b. New table of probability factors for seacoast guns (this table requires no interpolation and thereby simplifies computation).
- c. Range and speed components were included in the seacoast score. The speed component increases the score when the target is towed at speeds greater than ten knots, but does not contain a penalty when the target is towed at speeds below ten knots. The range component proper was not changed from that prescribed for the last target practice year.
- d. Antiaircraft searchlight practices will be conducted under the provisions of the pamphlet "Pro-

posed Regulations for Antiaircraft Searchlight Practices."

No. 873—Service Test of Long Distance Seacoast Data Transmission System T-6.—The T-6 Transmission System is designed to transmit data between base end stations and plotting room. It is built to operate over long distances and consists of a modified azimuth instrument, M1910, a power plant and transmission lines. The transmission of data does not interfere with the use of other lines of the same cable for telephoning. The system is self-synchronous to within five degrees. This installation was tested at Fort Hancock, N. J. It was found to be not entirely satisfactory for several reasons, the most important of which were complicated construction, slowness of vacuum tubes in warming up, and deficiencies in self-synchronization. The Coast Artillery Board recommended that:

a. No further development of the T-6 Data Transmission System be undertaken at this time.

b. The equipment now installed at Fort Hancock, N. J., be left there for the use of the battery to which it is assigned.

No. 874—Service Test of Seacoast Data Computer T-3.—The Seacoast Data Computer T-3 is a device for the automatic computation of firing data for seacoast guns. It can be operated in conjunction with horizontal base systems, vertical base systems, or with aerial position finding. The computer is large, heavy and extremely complicated. It was tested at Fort Hancock, N. J., and as a result of this test the Coast Artillery Board recommended that:

a. The development of a new computer using the principles of the Computer T-3 be held in abeyance for the time being.

b. That the Chief of Ordnance be requested to investigate the feasibility of modifying the present T-3 Computer for the purpose of rendering the T-3, T-6 and T-7 equipment, (plotting room to gun transmission system) now at Fort Hancock, N. J., suitable for continuance in service. One of the principal modifications consists in applying efficient follow-up motors to dials and sub-dials of certain parts of the T-3 Computer.

No. 886—Comparative Test of Antiaircraft Directors (T-8, M2 and M1A1 uncoupled).—The Antiaircraft Directors T-8, M2, M1A1, uncoupled and one R. A. Corrector were given a comparative test at Aberdeen Proving Ground at which test one member of the Coast Artillery Board was present, and other members witnessed parts of the test. The purpose of the test was to determine which director was superior to the others and what simplification was possible. All directors were, however, too heavy, too complicated and too expensive. It was evident that further development work with a view to constructing a simplified director should be undertaken. The Coast Artillery Board recommended that:

a. A program be initiated leading to the development of an antiaircraft director that will fulfill the following requirements:

(1) Permit of rapid quantity production in times of emergency.

(2) Be sufficiently accurate in the computation of data for which it is designed.

(3) Be portable and of light weight.

(4) Contain a parallax feature to permit operation at a distance from the guns.

(5) Be capable of manual operation by battery personnel of average ability.

(6) Permit, without difficulty, the application of suitable adjustment corrections.

(7) Be capable of computing data for fire by Case I½ as well as Case III.

(8) Be adaptable, with minor changes, for firing with various combinations of fuzes and ammunition.

(9) Be capable of control by some system of indirect pointing such as that for which the Tracker T1 is designed.

b. That the design for such director be submitted to the Coast Artillery Board for study and comment before a pilot director is built.

No. 943—Service Test of Reel Unit RL-26-T1.—This reel unit was developed to provide a means of laying and taking up wire by the use of a cargo vehicle. It is considered desirable that some device should be supplied as an article of issue rather than require each battery commander to construct his own, as is done now in searchlight batteries. It is desired that such device be as simple as possible and collapsible so that it can be carried along with other loads and not occupy much space. The unit supplied for test contained provisions for carrying two reels of one mile capacity each. In addition, it contained a small gasoline engine. The Coast Artillery Board considered that this device was too complicated and that the maintenance of a number of gasoline engines in the field would be difficult. The Coast Artillery Board accordingly recommended that a simplified hand-operated device be designed for the purpose of paying out and reeling in wire from a motor vehicle and that the general characteristics of such a device be as follows:

a. Two axles should be provided, such axles to be spaced so as to accommodate either the one-mile or the one-half mile reel.

b. It should be possible to pay out either one or two reels at once, the speed of paying out to be controlled by brakes.

c. Hand cranks should be provided for reeling in. It is desired that both reels be operated independently for reeling in, if practicable. If this is impracticable, at least one reel should be provided with a crank for taking in wire.

d. The frame should be capable of being folded or knocked down into as small space as possible for storage and shipping. In view of the large number of such devices that will be required, the simplest and lightest design consistent with durability is desired.

No. 944—Water-Proofing of Battery DeRussy, Fort Monroe.—Synthetic Drying Oil No. 23 and Synthetic Drying Oil No. 61, manufactured by the E. I. DuPont de Nemours and Company, were applied

to the ceiling of a magazine at Battery DeRussy, Fort Monroe, Virginia, to see if this paint would prevent water from seeping into the magazine. Normally, it seems that this paint is to be applied to outside surfaces so that the pressure of the water would tend to force the paint into the concrete. The paint, when applied to the interior of the magazine, did not prevent the seepage of water through the concrete. The Coast Artillery Board accordingly recommended that this test be discontinued. This paint, when applied inside, affords no relief from the bugbear of seepage and condensation.

No. 952—Photostating by the Photoflor Process.—The Photoflor is a commercial unit consisting essentially of a chemically covered plate which acts as a source of light to make reproductions of prints and documents. The Photoflor is used in making a direct print such as is done in normal contact printing. It can also, because of the peculiar characteristics of the chemicals employed, make what is called an indirect print by reflection. By this process a negative can be made of a document printed on both sides such that only the print on the desired side will be produced on the negative. From the negative so produced, any number of positive proofs may be made. The Photoflor plate is thus a substitute for the photostat machine, but the Photoflor plate cannot change the size of the document to be reproduced. It is valuable for those localities which are not provided with photostat machines. It provides a quick, reliable, inexpensive means of making a photographic reproduction of any document. The Coast Artillery Board recommended that a few Photoflor plates, 9 x 13, be purchased and issued to certain harbor defenses for a service test.

No. 957—Antiaircraft Data Transmission Systems.—This project covered various tests that have been made on all types of antiaircraft data transmission systems and, in addition, considered all of the comments received in target practice reports and other sources on material or physical features of antiaircraft data transmission systems. Continued change in equipment, with the supply of only a few units of any model, has resulted in there being on hand in any one organization a mass of materiel with parts that are not interchangeable. The systems considered were the M-2, M2A1 with T-1 extension, and the systems supplied with the T-8 Director. Considerable difficulty has been experienced throughout the service with transmission cables. These cables have not been sufficiently durable to withstand field service. As a result of its investigation, the Coast Artillery Board recommended that:

a. All cables supplied with data transmission systems be more durable than those now furnished. Cables should be at least as good as the "Tyrex" cable supplied by the Simplex Cable Company.

b. Fuze cables be equipped with a plug, and fuze setters be equipped with a plug receptacle.

c. All cables be equipped with a coiled wire guard at the place where the cable enters the plug.

d. Gun cables be of equal length and each long

enough to reach from the center to the corner of a 100-yard square with an extra length to permit traversing the gun.

e. Receiver dials be made more rigid.

f. A lock washer be provided for the nut which clamps the dials in place and a suitable socket wrench be furnished for adjusting this nut.

g. Receivers be constructed so that the value of the transmitted data and the value at which the gun is set can be read at all times.

h. Receivers on all systems be made lighter and less bulky.

No. 962—Gunner's Pay.—As a result of objections made to the provisions of AR 35-2380, December 5, 1932, which prescribes that the men attaining the highest scores will be designated to receive additional compensation for special qualification in the use of arms, the Chief of Coast Artillery has directed the Coast Artillery Board to make a critical study of the entire question of gunners' examinations and gunners' pay. Army Regulations 35-2380 supersedes the provisions of TR 435-310, January 2, 1932, which prescribed that a man, to be eligible for additional compensation as an expert gunner, must, at the time of his appointment, be actually performing the duties of one of the positions outlined under expert gunners' examinations and that a man, to be eligible for additional compensation as a first-class gunner, must, at the time of his appointment, be actually performing duties along similar lines or be one who would, in all probability, be selected later to fill an expert vacancy in the section or detail. The provision of TR 435-310 that "in the designation of men entitled to additional compensation, due consideration should be given to the battery or detachment commander's opinion of the relative value to the organization of those who have qualified as expert or first-class gunners", has also been rescinded. The study made by the Coast Artillery Board has been completed and definite recommendations have been made to the Chief of Coast Artillery. It is believed that the system recommended by the Coast Artillery Board and awaiting the action of the Chief of Coast Artillery, if put into effect, will eliminate the present objections and put the whole question on a satisfactory basis.

Projects Under Consideration

No. 908—Duco Surfacing of Guns.—This test, to be of any value, is required to run over a considerable period of time. The time limit has not expired. However, three features have developed:

a. The Duco paint on the 6-inch barbette carriage cracked and flaked off badly.

b. The gun proper, having much smoother surfaces than the carriage, is holding the Duco much better. "Simoniz" polish is now being tried on that surface, and so far it presents a very fine appearance.

c. Dulux paint was being tried out on another gun and carriage. This paint seemed very satisfactory up to the time a gun cleaner, ignorant of the conditions of the test, attempted to brighten the surface by ap-

plying a mixture that was said to contain linseed oil and turpentine. This left a mucilaginous surface that collected insects, sand and cinders. An application of gasoline seems to have restored the original finish.

No. 926—Homelite Generating Unit.—This is a commercial unit designed to supply power for farm use. It is to be tested for field use with mobile artillery. The unit has not been received.

No. 927—Radio Set SCR-177.—A partial report on this field radio set has been submitted. Reports from officers using this set have been received, and the Board's final report is in process of preparation.

No. 929—Field Chronograph (Jackson).—Captain A. M. Jackson, Coast Artillery Corps, who devised and is building this chronograph, reports that it is almost completed. The test will probably be delayed until after the Fort Knox exercises in order to permit Captain Jackson's presence at the test.

No. 931—Roller Bearings, 3-inch A. A. Gun Mount T1.—This is a test that involves the firing of 500 rounds from the gun on this mount. It is hoped that the few remaining rounds yet to be fired can be included in firings by the students of the Coast Artillery School during May, 1933. No special ammunition allowance was made for this test.

No. 937—Test of Submarine Mine Equipment.—This project includes several items to be used with the single conductor system. Tests to date have not proven conclusively just which of such items are to be made standard.

No. 941—Markings for Projectiles and Storage Cases.—This report, long delayed by the non-receipt of subsidiary reports, is now in course of preparation and will be completed during May.

No. 945—Chamber Sponge T-3 (12-inch Gun).—The sponge has just been received. While the device differs only in minor features from the sponge now adopted as standard, it should be tested, preferably in target practice. There is little hope of testing it at this post in target practice, and even an extended test at drill will be difficult due to the multiplicity of duties assigned the personnel of the harbor defenses.

No. 946—Range and Height Finder T-12.—This instrument was tested against a horizontal base system, and two other stereoscopic instruments; viz. T-9, and T-15. As usual, weather conditions interfered materially, but all tests have been made and the final report is in the process of preparation.

No. 947—Oil Clothing for Army Mine Planter

Service.—This clothing was issued to the crew of the Mine Planter *Schofield*, but the reports are yet inconclusive. It may be necessary to request that this test be made at some station where there is a more active mine planter and where weather conditions make more necessary some kind of special clothing.

No. 953—Radio Controlled High Speed Target.—Reports of firings at high speed targets indicate that more of such firing might be beneficial. A rapidly moving on-coming target would probably develop some unsolved problems. Salvaged material and improvised devices are being utilized in the development of a fast moving self-propelled target. Progress is slow and it is difficult to say when the project will be completed.

No. 954—Traversing Mechanisms for 10-inch and 12-inch DC, and Azimuth Pointer for 12-inch DC Guns.—These mechanisms have been installed but they cannot be given a thorough test for some time due to the fact that no troops are available.

No. 955—Depression Angle Indicator.—This is a device to be used in an airplane in connection with radio direction finders (Project No. 800, above). The direction finders locate the airplane, and this device is used by the aviator to locate the target with respect to the airplane's position.

No. 956—Lensatic Compass, with Leather Case.—This device has not been received for test and nothing is known about it.

No. 958—Device for Checking Mobile Artillery Sights.—It has been found that the sight mounts provided for all mobile Coast Artillery guns frequently introduced errors in azimuth as the guns are elevated. This device, now under test, is designed to determine the amount of this error (submitted by Captain J. T. Campbell, C. A. C.).

No. 959—Weston Exposure Meter.—This is a commercial device for determining proper aperture setting in photographic work. It is particularly applicable for use with antiaircraft spotting cameras, though it may be used for all types of cameras. The test of the device is now in progress.

No. 960—Draw-Bar Pintle Check, 155 mm Guns.—This is a device to prevent undesirable rotation of the draw-bar pintle of the 155 mm gun. Under test. (Submitted by Captain H. D. Cassard, 51st Coast Artillery.)

No. 961—Mounting Telescopic Sight, 155 mm Gun.—This is a mounting to accommodate a telescopic sight suitable for Case II firing. Under study. (Submitted by Lieutenant Colonel J. B. Taylor, C. A. C.)



Notes From Fort Monroe

Chapel Damaged by Fire

IT was with a feeling of deep regret that we learned of a fire which broke out in the Chapel at Fort Monroe on Thursday, April 27. This is of great interest to the majority of Coast Artillerymen for the reason that the Post Chapel at Fort Monroe, in their eyes, is more than a place of worship. It is almost hallowed ground to many. There are today in the Coast Artillery Corps many officers who were baptized at its font. Many others have answered "I will" at its altar and most of us have, at some time or other, been called upon to officiate in the last sad rites of friend and comrade within its sacred walls. Its memory is rich with cherished association. Other and more pretentious chapels there are without number but none will there be that can awaken deeper sentiments or fonder memo-



ries of sojourns spent at Fort Monroe, than the quaint old Chapel nestled in the recesses of the bastioned wall, almost concealed from view by holly and live oak trees.

At this point it may not be amiss to give a brief resumé of the early history of the Chapel. The official name is "The Church of the Centurion." It was erected in 1855 through the efforts of a Lt. McAllister, who at that time was connected with the Ordnance Depot at Fort Monroe. It is related that Lt. McAllister and two other officers were conducting experiments in the manufacture of powder in the laboratory of the Ordnance School. Something went wrong with the experiment and an explosion followed. Lt. McAllister was only slightly injured but his two companions were instantly killed. In a spirit of thanksgiving for his almost miraculous escape Lt. McAllister conceived the idea of raising funds with which to dedicate a memorial to his brother officers who had given their lives in an effort to develop a better quality of powder. After considerable delay and as the result of much effort the worthy project became an ac-

complished fact and Bishop John Johns of the Virginia Episcopal Diocese consecrated the Chapel on May 30, 1858. Since that time services have been held regularly in the old Fort Monroe Chapel and many distinguished visitors have worshipped at its altar or have passed through its portals.

The Chapel boasted of a number of memorial stained glass windows. These windows were among the finest to be found in Virginia. Fortunately only one of these windows was seriously damaged and it can be restored. Their loss would have been a real calamity because of their historical association, having been donated by prominent personages in loving remembrance of some friend or relative.

Strangely enough the fire broke out while funeral services were being held for 1st Sergeant Thomas E. Austin, Battery F, 52d Coast Artillery. The sorrowful assemblage was quickly converted into one of intense activity with the result that practically all of the historical treasures were safely removed from the Chapel. The prompt arrival of the fire department prevented its complete destruction and we are pleased to announce that under the direction of the Post Executive, Colonel Harold E. Cloke, the repair work promptly was started and it is anticipated that complete restoration will be accomplished within several months. The principal damage occurred to the pipe organ. Funds for this were raised by popular subscription and the organ installed in 1929. The damage to this is considerable but not irreparable. The cost is estimated at \$2,250. It is now proposed to raise this amount by voluntary contributions from members of the Coast Artillery Corps and any others who may be interested in this most worthy project. Contributions for this purpose will be appreciated and grateful acknowledgment made by the authorities at Fort Monroe. Any one who desires, may send a contribution to the Adjutant, Fort Monroe, Virginia.

Training

IN addition to the scheduled target practices for the troops at Fort Monroe and firings by the Battery Officers' Class at the Coast Artillery School, plans are under way for a battle practice to be participated in by the 51st and 52nd Coast Artillery. For this practice the regiments will move to Fort Story on May 12, remaining there until the conclusion of the battle practice which is scheduled to take place on June 10. The firings will be with the 155 GPF's, 8-inch Railway guns and 12-inch Railway mortars. This is almost an annual event participated in by the members of both classes at the Coast Artillery School. It marks the culmination of the artillery training for the students and has been found to be of great practical benefit.

Tony—A Pen Picture

By M. A. Myers

IN THE last quarter of the nineteenth century in far away sunny Italy a son, by name, Antonio, was born to the House of Sarubbo. He was one of a large family of boys, and grew up after the manner of the children of his country; mayhap dreaming dreams and seeing visions. Of this Antonio Sarubbo and his boyhood in his native land we know little, save that like the youth of that country he was expected to follow in his father's footsteps, and to that end studied to be a railroad telegraph operator, which vocation, however, he never followed. While waiting for a position he assisted his brother in the

quiring some of the French tactics, adopting the best points from the two.

This is a vague outline of the youth as he embarked for the United States in 1900, upon the invitation of his friend Puccini, to seek his fortune. Here we bid farewell to Antonio Sarubbo of Italy and greet TONY of Fort Monroe, a name as familiar to the Coast Artilleryman of this generation as is that of "Keeny" to the previous one.

Here he came from New York with his friend Puccini and here he has remained. He opened his first shop in the old Chamberlain Hotel, where he shaved and cut the hair of Artillery officers from their "Inc" days, when there was plenty of hair on their heads and little on their chins, on through the years as they returned to Fort Monroe from time to time, climbing to higher rank, with less to cut and more to shave. He is very proud of his record during these years, for he has never missed a day from his shop because of illness.

Tony has seen the old Chamberlain reduced to ashes, and a stately pile of brick and mortar—The New Chamberlain—emerge, where for the past year and over he has plied his trade. During the interim, however, from 1906 until 1931, he had his shop in the Sherwood Inn, which, like the old Chamberlain, has now passed into history. Those are the days he now loves to talk over, and what tales he can tell of his various activities. How he taught the women Italian and French pronunciation to assist them in their singing; made translations for the COAST ARTILLERY JOURNAL and also made translations for Colonel Lewis in connection with foreign correspondence concerning the Lewis gun.

Soon his cunning as a fencer was brought into play, and many a bout was staged with the officers, who at that time were greatly interested in this sport. The old shop bore many evidences in its scarred woodwork and nicked walls of the lively engagements he had with sword and foils, though he at all times prefers the latter.

During the period before the war fencing was so popular among the officers that at times as many as sixty were members of his class. In this he was assisted by his friend Puccini, also a fencer of merit.

Then came the war, turning men's minds to more serious matters, bringing to Fort Monroe its greatly increased personnel, which automatically increased Tony's business to a point where he had no time for play. He was a very busy man in those days, having at times twenty-five assistants; for officers and men, in war or peace, must have hair cuts and be shaved, and Tony saw to it that the Fort Monroe contingent was well groomed at all times.

Another impetus was given to his trade about this



ANTONIO SARUBBO.

Sketch by M. S. Engelhart, '33

latter's barbershop, learning this trade, which in the old countries requires some medical training, such as leeching, the alleviation of black eyes, hang-overs and etc.

This much for the practical equipment of Antonio Sarubbo, except to say he had no military training, his brother having served for him, a perfectly proper procedure in Italy. Vastly more can be said of the artistic and cultural side of this man when he came to our shores. Like all sons of Italy, art and music were his heritage, while he is also an accomplished linguist, speaking English, Spanish, Portuguese and French in addition to his mother tongue. He is a fencer of no mean ability, having studied the Italian school at the Acadami Campo Basso and later ac-

time as bobbed hair among the women became the vogue. His first venture in this field was almost disastrous as an irate husband appeared on the scene the following day, and to quote Tony, "He threatened me." When madam was in need of a second haircut, Tony was prepared; he was able to recommend a very good barber in Phoebus who made a specialty, as Tony said, of cutting ladies' hair. From this one gathers that Tony is a peace-loving soul. All that has long since changed, and now he numbers as many women as men among his clientele.

And the children! How they welcome the summons to go to Tony's for a hair-cut, for among razors and shears, oil-paintings and rapiers there is always to be found a goodly store of lollipops which Tony keeps on hand for his youthful friends. In fact one small shaver of three knows not "lollipops" for to him this childhood sweet is a "tony."

Tony has never married; says he couldn't afford it, but lives with his friend Puccini in nearby Phoebus, with whom, as a side line, he runs a general store. With all of his Latin love for the arts, he yet has a shrewd mind for business as shown by his many and varied interests.

He is now an American citizen, having taken out his citizenship papers four years after reaching our shores. He has made two trips back to Italy, the last in 1910. One of his chief joys is to find a customer who can talk with him about his beloved birthplace, and at one time he did find such a listener in a Captain in the QM Corps who was stationed here, this officer having been educated in Italy, knowing the country that Tony knew and loved as a lad. However, America and Fort Monroe are now country and home to him, and, while he is a staunch admirer of Mussolini, believing in law and order, he has no desire to leave the shores of the Chesapeake Bay for those of the Adriatic.

In order to help his countrymen who seek American citizenship he has always taken a vital interest in the Order of Sons of Italy in America, an organization designed for that purpose. He was head of the local chapter or lodge for some seven years, and he is very proud of the fact that whenever the Italian Ambassador visits Tidewater Virginia, he—Antonio Sarubbo—has the honor to represent his society.

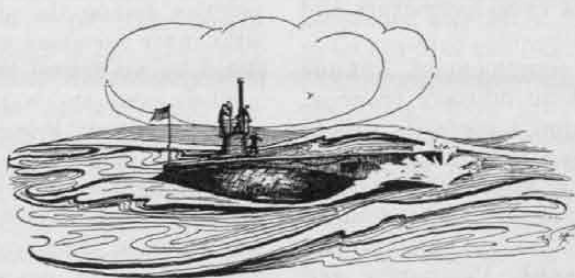
Now we come to the artistic side of this most versatile and accomplished man. He is adept on the mandolin and guitar, he prefers the former, and could the old composers of Italy hear him render their masterpieces, they would know that time, nor place, nor instrument could destroy the beauty of their work, when interpreted by Tony on his mandolin. He has also been able to turn this talent to profit, having at one time been the leader of an orchestra. It was this orchestra that furnished the music for the first coast to coast radio program broadcast from Norfolk.

Notwithstanding his many attainments his real love, his true expression of himself, is his painting, to him painting means oils and oils only, having no interest in the other schools. One finds him in his shop of a morning with brushes and palette, then we see and know the real Tony—the artist. Reluctantly he puts down his brush and leaves the unfinished canvas to trim a blonde, brunette or Titian bob. His true love of the beautiful shows, however, for he is just as anxious to bring out the best in a head he is grooming as in a landscape he is painting.

His interest in drawing developed when a child, and he is practically self-educated in this line; has some very fine books of painting, old and modern, and has used every means offered to improve himself. He exhibited some twenty-six of his paintings in Norfolk in 1927; has sold a number, while the walls of his shop are covered with his efforts. He particularly enjoys painting subjects from around Fort Monroe—a flight of sea gulls, a corner of the moat or a sailboat on the Bay. He, like all artists of his country, loves to put on canvas his conception of the Madonna, but he does not attempt portrait work.

And so we leave him, wielding his shears for profit, his paint brushes for the expression of his art, dreaming perhaps of the days when he first came to Virginia, when officers, now wearing the eagles or stars, were carefree and beardless. Looking eagerly for the opportunity of making new friends among the Coast Artillery officers of the Class of 1933.

In closing we salute you, Antonio Sarubbo, linguist, tonsorial artist, musician, painter, fencer, and business man. A true friend of the Coast Artillery, known and respected by as wide a circle of coast artillerymen as ever fell to the lot of one individual.



NATIONAL GUARD NOTES

Pay of National Guard

INCLUDED in the Army Appropriation Bill for the fiscal year 1934, which becomes effective on July 1, there is a provision directed at those officers and enlisted men of the National Guard who are on two of Uncle Sam's payrolls. The provision prohibits any of the funds made available by the Act being used for pay, allowances, traveling or other expenses of any officer or enlisted man of the National Guard who may be drawing a pension, disability allowance, disability compensation or retired pay from the Government of the United States. The measure provides further that the prohibition shall not extend to officers and enlisted men who are included in the above categories who surrender their compensation for the period of their service in the National Guard. The funds involved in the provision include a wide range; armory drill pay; field training pay; payment of individuals for transportation to and from field training camps; expenses and pay of officers and enlisted men who may be injured during field training and who are entitled to medical treatment and pay under certain circumstances under the law; the pay of animal caretakers, materiel caretakers and automobile mechanics; and target range caretakers.

This means that officers and enlisted men of the National Guard who are drawing any of the compensations enumerated will have to decide upon the pay they will take, that is whether they will terminate their National Guard status or whether they will surrender the compensation they are receiving from the Government. They cannot continue to draw compensation and stay in the National Guard on a non-pay basis, for it is against the policy of the Government to accept the services of an individual without pay, when pay for his services is provided for by law. This policy has been modified in order to take care of present Adjutants General, but it is so provided in the law as will be shown later.

Those officers who are on the Emergency Officers' Retired List, but who draw no pay from the Government will not be affected by the law for they are receiving nothing and hence cannot surrender something they do not have.

One of the questions that arises in connection with the practical application of the law is as to just how the surrender of pension, compensation or retired pay is to be effected by those officers and enlisted men who elect to surrender it and remain in the National Guard. The law as enacted applies only to the fiscal year 1934, but it is to be expected that it will be repeated in future appropriation bills. If officers and enlisted men surrender their compensation for the year, what will be the process of having it restored in case they

sever their connection with the National Guard? Again, by making such a surrender do they lose any rights to future pension or compensation? These are questions that affect a large number of men who are in the Guard.

The law specifically provides that those present State Adjutants General who may be drawing emoluments



A command post truck developed by the National Guard of Pennsylvania. Walls are also provided which permit the whole outfit to be inclosed in canvas.

from the Government, may continue in a federally recognized status without pay.

The application of this law will require great care on the part of State authorities and all unit and organization commanders who certify payrolls. If an officer or enlisted man who is drawing compensation is paid National Guard pay on one of these certified payrolls, the amount most certainly will be held against the officer making the certificate and he will eventually have to refund the amount to the Government.

Medical Treatment at Camps

THE problem of reducing the expenditures for medical attention at field training camps has been put up squarely to the state authorities by the Chief of the Militia Bureau. This subject was one of the main topics of discussion at the National Guard convention at Norfolk last Fall, and a Resolution was adopted calling upon those charged with the administration of the law to correct the deficiency and reduce the expenditures which have been increasing at a rapid rate each year.

The elements under consideration are the exorbitant charges for medical attention by civilian hospitals, where sick and injured National Guardsmen are sent for care and treatment; the hospitalization of apparently trivial cases, which under ordinary circum-

stances should be treated in quarters; operations for hernia, which are invariably disallowed, as they are not incident to camp service; injuries due to the carelessness or wilful neglect of the party injured; and cases "not in line of study."

The matter was also considered by the executive council of the National Guard Association and they concurred in the recommendation of the Chief of the Militia Bureau to the effect that State authorities should be enjoined to take effective measures for reducing expenditures. These may be effected by eliminating chronic cases of hernia, appendicitis, and other ailments of long standing which may be aggravated by camp service. In many of the states where expenditures have been kept down to reasonable figures they have had a searching physical examination and all men suffering with such ailments have been sent back home forthwith, and before they have a chance to get on sick report. Another means for meeting the situation is through medical officers treating ordinary cases in camp and keeping them out of civilian hospitals. In those camps where a medical regiment is in attendance they can set up an emergency field hospital for the handling of these cases and in any event camp hospitals under canvas can be improvised that will take care of many of them in an entirely adequate manner.

In any event those States that allow unreasonable and unnecessary expenses to be run up may expect to have their cases thrown back on them to be paid for out of funds other than federal, and it is expected that they will take measures to prevent such procedure.

The National Guard First Sergeant

Duties and Functions of the First Sergeant

The First Sergeant should be the unit commander's personal contact man, striving at all times to promote and maintain morale and enthusiasm within the organization. Because of his personal contact with the men he learns of problems that in the ordinary course would not come to the attention of the officers; it is through him that most of the difficulties can be adjusted to the satisfaction of all concerned.

He should be on the look-out for suitable recruits (especially specialists) for the organization.

He should, through study and application, prepare himself for promotion to the grade of Second Lieutenant in order that he may be available for appointment when there is a vacancy in his unit.

He should conduct himself and do his work in such way as to inspire the confidence and enthusiasm of all the men in the unit.

He is responsible for the conduct of the orderly room and the work turned out. He checks up on the company clerk and places all communications and papers which require the signature of the unit commander on his desk.

He sees that the bulletin board is kept clear of obso-

lete material and that all pertinent information is posted on it.

Armory Drill Periods.

He arrives at the armory at least 30 minutes prior to the time set for the assembly of the unit, and sees to it that the arm racks and the supply room are opened up.

Previous to assembly he ascertains from the squad leaders whether the men of their squads have on the proper uniform and are supplied with all the equipment necessary for the conduct of the activities included in the schedule. This should be accomplished through a formal report by squad leaders.

He forms the unit and makes the report prescribed by the Drill Regulations. He makes a list of absentees and ascertains from platoon commanders whether any men on the list have been duly excused. He endeavors to get in touch with A.W.O.L.'s. He totals the attendance on Form 100 work sheet and places it on the unit commander's desk to be initialed.

During drill periods he sees to it that no men are loitering about the armory and that all are present at the scheduled classes or drills.

He provides a schedule to guide the N.C.O. in charge of quarters and has him make a report before he leaves the armory in order to check up on closing and locking doors and performing other scheduled duties.

National Guard Training and Industry

ONE of the fundamental needs of modern industry is for men who are capable of pulling together in organized formation for a common objective. This is not to say that individual genius has no place, for it has; but in the vast majority of instances big achievements are clearly the result of organization and organized effort. In all of this there must be divisions of responsibility and labor. There must be various grades of authority and there must be loyalty and responsiveness all along the line.

Military training, such as thousands of young men receive through their membership in the National Guard, does much to supply these basic needs. It puts a something into men which makes for alertness, attention, concentration, responsiveness and self reliance. And along with these individual qualities it develops the spirit of organized effort in its most effective form.

The ability to command requires first the ability to obey—that instinctive respect for constituted authority upon which all organization procedure is founded. For this reason it is natural that young men who have won their bars and chevrons in military organizations should gravitate towards positions of leadership in business and industry. Their example exerts a wholesome influence in any organization. Their ready grasp of essentials tends to give them substantial recognition and they forge their way to the places of responsibility.

National Guard Falls under Economy Axe

THE National Economy Law of 1932 contained a saving clause whereby the employees of the Government drawing less than \$1,000 a year were exempted from its provisions. Thus the armory drill and field training pay of the National Guard did not enter into the calculations. It is not possible for a National Guard officer or enlisted man to pile up a pay roll during the year in excess of the exemption.

Under the present economy act there is no such exemption and the 15 per cent reduction must apply to all funds received from the Federal Government. This includes armory drill and field training pay of all officers and enlisted men of the National Guard and there can be no exceptions.

The armory drill pay roll totals up to something like \$14,000,000 per year. Fifteen percent of this amount included in the reduction will effect a saving of approximately \$2,100,000.

The same provision of the law applies to the field training pay and allowances of officers and enlisted men of the National Guard. The total allocated to this item is some \$5,000,000 and a 15 per cent reduction amounts to about \$750,000.

Then too, the pay and allowances of officers who attend the Army Service Schools come under the economy axe and are subject to the 15 per cent cut. This amounts to a savings of about \$22,500.

It will thus be apparent that the National Guard personnel will contribute a total of approximately \$2,872,500 to the economy program all over the United States, and this is about 8% of the entire appropriation for the National Guard included in the Militia Bureau Budget.

Reduction in Sergeant-Instructors

IN accordance with the policy expressed in a resolution adopted by the National Guard Association at Norfolk last fall, the Sergeant-Instructors on duty with the National Guard will be reduced in number to the point where there is one for each regiment or separate unit.

This reduction is to be effected by Corps Area Commanders as vacancies occur in the natural course of events, in the whole D.E.M.L. personnel in the Corps Area. This means that should a vacancy occur in a R.O.T.C. unit a man who is now on National Guard duty could be transferred to that duty in effecting the reduction contemplated.

The reduction is to be made only in the fourth grade so that the places in the first three grades heretofore allocated to the Corps Area will be maintained intact and available for the promotion of qualified men. In view of the changes it will be sometime before there will be any vacancies for duty with the National Guard and it will be useless for men to apply for such duty.

Guard-O-Grams

House Military Committee

In the organization of the Military Committee of the House of Representatives a sub-committee has been appointed and charged with the consideration of all questions relating to the administration, organization, and training of the National Guard and the Organized Reserves. The chairman is Hon. Leslie Hill of Alabama, a man who has always had much interest in the National Guard. The other members are Messrs. Lloyd, Wash.; Faddis, Pa.; Thompson, Texas; James, Mich.; Andrews, N. Y.; and Christianson and Kvale of Minn.

Armory Drill Pay

A master sergeant of the National Guard assigned to a regimental headquarters company was directed by his regimental commander to attend the armory drill assembly of the regimental staff officers. For this service he claimed armory drill pay covering such assemblies. Payment was refused on the rolls by the Finance Officer who quoted as his authority, a decision of the Comptroller General of October 22, 1932, as follows: "An enlisted man belonging to an organization of the National Guard is not entitled to armory drill pay for attending the ordered assemblies of the regimental staff officers, as much as assembly is not a drill in accordance with section 110, National Defense Act." In accordance with this decision it would seem that master sergeants assigned to a unit (Headquarters Company) must attend drill formations with that unit in order to be entitled to armory drill pay.

Minority Discharge

An enlisted man in the National Guard was discovered to be under 18 years of age. Under the provisions of paragraph 64, NGR No. 25 such a person cannot legally become a member of the National Guard and must be discharged. The question has come up as to the kind of discharge to be given, and this was put up to the Militia Bureau. The ruling of the Chief of the Bureau was to the effect that: "A soldier discharged on account of minority should be discharged with the form of certificate to which his service after enlistment shall entitle him. If his service has been honest and faithful he should be given an honorable discharge."



A camouflaged Radio and Panel Station used at Mt. Gretna, Pa., during a C. P. X. at the National Guard Encampment last summer.

The Foreign Military Press

Reviewed by Major Alexander L. P. Johnson, Infantry

BRAZIL—*Revista Militar e Naval*—September, 1932.

"The Bolivia-Paraguayan Conflict," by De Pizarro Loureiro.

The conflict between the two South American republics hinges upon the interpretation placed by them upon the "uti possidetis" agreement of 1810. Bolivia claims de jure title, and Paraguay has a de facto title to the disputed territory of the Gran Chaco, although Paraguay asserts both with equal force in support of her claim.

The origins of the conflict must be traced to the period of emancipation of South America from Spanish rule. Columbia formulated the doctrine in 1819, that the boundaries of the new republics be determined in conformity with the laws of the mother country in force in 1810. Since all latin republics assented to this principle, the author quotes the eminent Brazilian authority, Euclides da Cunha, to the effect that "de facto possession, though effective and real, is not sufficient to establish national boundaries."

The author states, that Bolivia, which constituted the Royal province of Charcas, inherited the boundaries assigned to it by the Spanish monarchs. These included all of the Chaco Borealis. Paraguay, on the other hand was formerly the province of Guayara, whose boundary in colonial times was marked by the Paraguay River. He charges, that Paraguay advanced her claims in the Chaco region at a time when Bolivia was in the throes of internal difficulties and lacked the necessary means of opposing Paraguayan aggression.

FRANCE—*Le Revue d'Infanterie*—December, 1932.

"Russian Ideas on the Employment of Modern Tanks," by Lieut. Col. Mendras.

"A good communist," the author writes, "loves everything scientific or technical, everything that is new or bears the imprint of tomorrow. The Soviet military publications indicate, that the army is no exception to this rule." It, therefore, seems natural, that the military authorities of Soviet Russia should devote much thought to mechanization, motorization and other modern means of warfare.

The author presents without comments the views expressed by Soviet military writers on the problem of rapid exploitation of a successful penetration of a hostile front by mechanical means. They visualize an attack in two principal waves, the first or assault wave, and the second or exploiting wave which is assisted by mechanized and motorized forces operating against the hostile flank. Russian military writers believe, that modern tanks, a powerful air fleet and artillery permit a complete discard of attrition warfare in favor of vigorous action which seeks to smash the entire hostile front. The following principal means of the attack are enumerated:

1. Tanks with power of long range action or heavy artillery capable of effective action against hostile rear areas, command posts, artillery, reserves and installations.

2. Tanks for infantry protection—Penetration of the hostile front and action against the enemy's main line of resistance would be their principal mission.

3. Infantry support tanks which would attack in close contact with the supported infantry.

4. Long range artillery for counter-battery to neutralize hostile artillery fire before and during the initial stages of the attack. Supporting artillery with the mission of neutralizing the hostile main line of resistance and to support the tanks during their advance.

5. Antiaircraft artillery.

6. Attack aviation with the mission of attacking hostile artillery and reserves, at the same time to keep away hostile aircraft.

7. The Infantry, which delivers the final blow against the hostile position.

The relative blindness of the tank is deemed its principal weakness. The hostile artillery is its greatest enemy, hence it is imperative that it be neutralized. On the other hand, a field artillery battery protected by a mine field could effectively resist a company of Christie tanks, Soviet experts think. They estimate, that 200 mines (10 tons) will close a front of one kilometer, and that it will take two companies about two hours to prepare such a mine field. The estimate as to the number of tanks required is high. For a corps attacking on a front of 6 to 8 kilometers, according to Soviet estimates two battalions of tanks for long range action, one battalion for infantry protection and three battalions for direct support of the infantry would be required.

For effective employment of their Air Force, Soviet military writers advocate concentrated action in time as well as in space. They estimate, that one bombing squadron would be necessary to attack effectively a battalion of field artillery in position, or a regiment of infantry in route column.

Close liaison between all elements of the attack is emphasized, hence the jump-off time of the different echelons must be carefully determined and coordinated. In the Soviet military conception the second tank wave should be timed to follow the first at an interval of five minutes; seven minutes should elapse between the jump-off of the second and third waves, while the infantry as the fourth wave should follow after a lapse of three additional minutes. This time schedule may have the inherent defect, that during the approach to the line of departure, the three tank echelons and their supporting artillery would have to

pass the infantry column, hence is liable to cause crowding, confusion and disorder.

Russian military writers apparently take issue with the view that modern tanks permit the omission of artillery preparation as a means of securing the effect of surprise. On the contrary, it is thought that where hostile defence is organized in depth, artillery preparation for an hour is indispensable in order to neutralize the enemy's strongpoints and to insure the safe arrival thereof of the attacking tanks. Moreover, they believe, that these tanks should be provided with special artillery support. The proper time for the air attack against the hostile artillery and reserves is, in the Russian view, the precise moment when the supporting artillery must lift its fire. The Soviet military experts believe that perfect coordination may be achieved by assigning to the division a definite objective which should include the hostile artillery positions, a total depth of advance of 6 to 8 kilometers. This objective the division must reach without halt or delay.

Infantry mobility on the march and in combat, the Russians believe, must correspond to the striking power of that arm. In order to achieve that end, they advocate that:

1. All infantry be motorized and that all motor transport be provided with protective armor;
2. In addition to its normal and traditional components, the infantry regiment should include a reconnaissance company consisting of three sections (light armored car section, light tank section and a very light tank section); one company of medium armored cars; a chemical warfare company, and a motorized antitank battery. The battalion should include a company of armored cars with machine guns; one company of small tanks, and one motorized artillery battery (consisting of an antitank section, an AA section and a trench mortar section);
3. The combat train should consist of armored tractors, the field train of motor vehicles on three axles;
4. The supporting artillery of the regiment should likewise be tractor-drawn and armored.

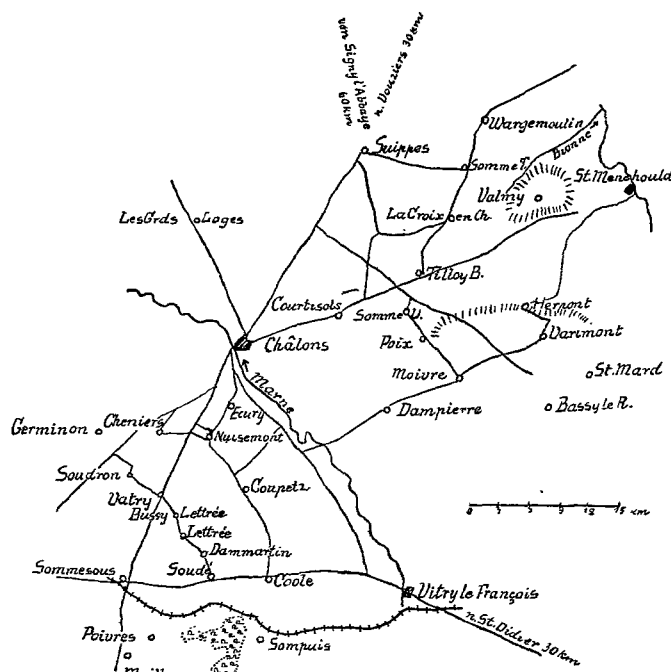
GERMANY—*Militär Wochenblatt*—November 11, 1932. "The French Manoeuvres", By No. 72.

As usual, several divisions, corps and army troops and air units participated in the last annual fall manoeuvres of the French Army. They were labeled "exercises of all arms", the author states, partly to keep away foreign military attaches and partly to mislead the public. The object of these exercises was to test new materiel and to determine the advantages which might accrue from the employment of motorized and mechanized forces in turning movements. Full secrecy was maintained even to the exclusion of press correspondents. The 15th Division comprising three infantry regiments was motorized for purposes of these exercises. In the first phase this force opposed an infantry division of four regiments, while in the second phase it operated against a reinforced cavalry division.

During the first phase (Sept. 19-22) the Blue 15th Division advancing from the north reached the area north of Chalons on Sept. 18. At the same time, the 2d Colonial Division assembled at Mailly. Both divisions represented the extreme west flank of their respective main forces. On the following day, Sept. 19th, the 15th Division was to cross the Marne. Motorized elements were to capture the bridges by surprise action and sweep aside any opposition to the crossing.

The Red air forces located the Blue Motor Column and attacked it near Les Grandes Loges. Blue aviation countered by bombing Red landing fields. The Blue Motor Column advanced rapidly, meeting weak resistance, and in four hours reached the line Germinon-Soudron-Vatry. In course of the afternoon the column pushed its advance to the vicinity of Sommesous-Cooles. The crossing of the Marne was effected under cover of darkness, the Blue commander deciding to detruck his division in the area Cheniers-Nuiseumont-Ecurey. On the following day, about noon, Blue attacked the Red defensive position along the line Poivres-Sompuis, and penetrated the first position. On Sept. 22, Blue heavily supported by tanks, resumed the attack making the main effort on its right, captured the Red first position and broke into the second. The ease with which Blue gained success over the numerically superior Red infantry, in the author's opinion, was surprising, and he ascribes it to great artillery superiority and tank support.

During the second phase (Sept. 25-29), the motorized 15th Division (red) operated east of Chalons



against the 1st Cavalry Division (blue) consisting of two regiments and a motorized brigade. On the evening of Sept. 25, this force reached Signy L'Abbaye, while the 2d Colonial Division (red) arrived at Vitry Le Francois. Both units represented the extreme western flank of their respective armies, each destined to

turn the hostile flank. On the morning, Sept. 26, the motorized elements of the cavalry division advanced in two columns on Vitry Le Francois. At the same time, the 2d Colonial Division started its march on St. Menehould. At 8 a.m. advanced elements of the cavalry (dragoons and armored cars) encountered weak detachments of the Red flank guard (motorized infantry and dragoons portée) near Suippes. These were readily brushed aside and at 10 a.m. Blue reconnaissance patrols reached Dampierre and Moivre, but were repulsed and driven back. Erroneous impressions created by false reports of this action caused the Blue commander to halt his column for several hours, and consequently he did not reach Dampierre until too late to reach a favorable decision.

On September 27, heavy fog blinded aerial observation. Believing that he faced the entire 2d Colonial Division, the commander of the Blue motorized brigade decided to occupy a defensive position along the line: Courtisols—Somme Vesle—Herpont, pending the arrival of the remainder of his division. Red developed in regimental assembly areas at Varimont, Poix, St. Mard, and Barry Le Repos. Apparently the fog prevented a Red attack against the overextended line of the Blue motorized brigade. The latter promptly began aggressive reconnaissance until relieved by mounted troops. With the lifting of the fog, about noon, undecided frontal engagements developed. On the morning, September 29, the 2d Colonial Division launched a well-coordinated attack. Air forces on both sides participated in this action. At 9 a.m. the Blue commander launched a strong counterattack with his motorized brigade supported by attack aviation and succeeded in recapturing the heights north of Valmy. In this engagement, the author notes, contrary to customary practice, tanks attacked without accompanying infantry. By way of comment, he observed, that French military leaders, conscious of the superior strength of the French Army, are determined to capitalize this advantage to the fullest extent. It is but another proof, the author adds, of the baselessness of French fears relative to security.

Military Notes: In the July-August number of the *INFANTRY JOURNAL* of last year (1932) we reviewed the French plan for the reorganization and unification of the War, Navy and Air Ministries into a consolidated Ministry of National Defence. That change, which had been developed by M. Maginot, was put into effect by Tardieu when he assumed the premiership in the French government in February, 1932. With the advent of the Heriot cabinet, the National Defense Ministry disappeared, and the three separate ministries for the fighting services were revived. Evidently the French found that this consolidation was not productive either of economy or efficiency.

GREAT BRITAIN—*The Journal of the Royal Artillery*—October, 1932.

"A Momentous Mission," by Col. J. H. Marshall-Cornwall, C.B.E., D.S.O., M.C., etc.

An interesting study of the historic mission en-

trusted to Lieut. Col. Hentsch of the German Great General Staff by General von Moltke, in the early days of the World War. German military historians hold Colonel Hentsch responsible for ordering the retirement of the German First and Second Armies from the Marne to the Aisne in September, 1914. The author takes issue with this point of view, and endeavors to show that both General von Kluck and General von Bulow, commanders of the First and Second Armies respectively, had in fact decided upon the retirement before the arrival of Colonel Hentsch at their command posts. The author believes, that the real explanation of the "Miracle of the Marne" is that the British Expeditionary Force turned up where it was not expected, opposite the gap which had developed between von Kluck's and von Bulow's armies, and that it did so at the moment when both the German and French armies had fought themselves to a standstill. The author concludes that if Colonel Hentsch really did influence the commander of the First Army, General von Kluck, in his decision to withdraw, he probably saved that army from an even greater disaster.

—*Journal of the Royal United Service Institution*—November, 1932.

"The Development and the Future of the Fortress," by Major General Sir H. F. Thuillier, K.C.B., C.M.G.

An interesting lecture delivered before the Royal United Service Institution upon the part played by fortifications in the World War with the object of determining whether or not it is worth while to build and maintain permanent fortresses for future wars.

The author points out, that at the outbreak of the World War the Franco-German frontier, from Switzerland to Luxemburg, a distance of about 200 miles, was organized for defense by both France and Germany. The French defensive system consisted of two "fortified regions" each comprising a group of fortresses supplemented and supported by a number of smaller forts, field entrenchments and obstacles. The "fortified region of the Vosges" extended from Belfort to Epinal; the "fortified region of the Meuse Heights" extended from Toul to Verdun. Between these regions was an undefended gap, the Troué de Charmes. Between the northern fortified region and the Belgian frontier was a similar undefended gap, the Troué de Stenay. The basic idea was that the fortified regions would cover the mobilization and concentration of the French field armies and hold up any German advance on those areas, while any German attempt to push through the undefended gaps would soon expose their flanks to the fortifications and place the invaders in a very unfavorable situation. The lecturer stressed the difference between these fortifications, whose strength lay in the grouping of large fortresses and smaller forts into a connected self-supporting system covering a large area and the old time single fortresses built around towns.

The Germans had similar defensive installations around Strasbourg and around Metz and Thionville. Since none of these fortifications were attacked, the

lecturer observed, it is impossible to tell how they would have withstood the fire of the type of howitzers used by the Germans elsewhere. Their strategic importance is, however, best evidenced by the fact, that the Germans decided to make their invasion of France through Belgium because they believed that the French fortifications would cause such delays and difficulties as to preclude a swift decision.

General Thuillier estimates the approximate total cost of the French defences of the Vosges and the Meuse at about £16,000,000, an average of £400,000 a year for forty years, or the equivalent to the cost of three or four days of actual warfare. He compares this with the cost of battleships from seven to eight million pounds sterling having a life of twelve to fifteen years. He stresses the fact that the strategic effect of these fortifications was largely psychological. Their existence produced a certain idea as to their strength, yet it is impossible to say now whether this idea was true or false. The Belgian fortresses of Liège, Namur, Antwerp withstood the German attack for only a few days. Maubeuge, the only French fortress attacked in 1914, fared no better. Verdun differed from these, since it was never isolated or subject to all around investment. General Thuillier aptly calls it a strong bastion in a long battle line. Moreover, by the time the Germans began their operations against Verdun, in 1916, France had lost faith in permanent fortifications and had placed her main reliance upon field fortifications, several miles in front of the old fortress. The Germans succeeded in taking Fort Douaumont, but the operation as a whole proved one of the costliest of failures of German arms.

Among the fortresses of the East, only Przemyśl, Novo-Georgievsk and Kovno sustained attacks of importance. The first of these, as will be remembered held out for quite some time, finally surrendered when its supplies were completely exhausted and relief was not in sight.

The lecturer found that the average length of the twenty-five principal sieges during 1702-1713 was thirty-four days. They might have been prolonged had the defending garrison held out to the last. Conditions and the customs of the day, the small size and restricted mobility of armies, the hope of receiving substantial reinforcements practically nil, favored capitulation with the honors of war before the final assault. It enabled the beleaguered garrison to withdraw from the fortress, hence this was considered less of a calamity than the total loss of the command which would inevitably have resulted had they resisted to the last. It was Napoleon who first inculcated the idea that a fortress must hold out to the last man.

The development of modern weapons opened a new phase in the matter of siege operations. They enormously increased the tactical strength of the defensive. General Thuillier finds, that the most successful defences of this period were those of the second half of the XIX Century, and that the worst were those of the World War. He believes that there is nothing that permanent defences have done during this period that has not been done, and generally better done by field

fortifications. He assigns as one reason for his opinion the fact that the pre-war type of fortress embodied gross tactical defects. These fortresses were as a rule very large and conspicuous; they contained infantry as well as all types of artillery; they lacked the advantage conferred by organization in depth, and they were nearly always sited on commanding ground, hence capture gave to the attacker valuable observation and command over the interior. Moreover, they afforded the enemy an opportunity to concentrate from dispersed artillery positions an overwhelming fire upon each fort in succession. Another reason for his adverse opinion is the fact, that fortresses soon become obsolete hence failure in the face of modern weapons was inevitable.

The lecturer concluded his address by expressing the belief that modern conditions dictate the necessity of organizing the defence in depth. This depth will have to be so great that all-around defence on the lines of the old ring fortress is no longer practicable. Moreover, the area required by modern defence is so great, that it requires an army to defend it. It is unthinkable, he states, to allow so large a force to be invested and isolated, and to be deprived of its mobility. He believes that permanent defences in the future will take the form of large defensive regions, organized in depth on the line of defensive zones developed during the World War. Such fortified regions may serve: first, as pivots on which field armies can operate, as were Verdun and Ypres; second, as a barrier similar to the fortified regions of the Franco-German frontier, or third, to bar a line of advance which cannot be readily turned or passed by. The defending garrison will consist of formations of the field army and not of static fortress troops of lower physical category or inferior training.

In conclusion, General Thuillier observes, that the employment of mechanized formations of considerable size may have some effect upon the question of fortifications, but he disagrees with those, who voice the opinion, that the development of mechanized forces will render defensive works unnecessary. On the contrary, he strongly believes that the more mobile the enemy's forces, the greater will be the necessity to defend important localities by means of defensive works. A study to determine the best type of defence for this purpose, he states, has not yet been undertaken, but he thinks it might take us back to a modified form of the ring fortress. This, however, he believes, will be a small place, defensible by a battalion or brigade (regiment), not intended for prolonged resistance, but proof against a raiding force with armored vehicles.

—*The Army, Navy and Air Force Gazette*—March 2, 1933.

“The Fighting Value of The Chinese Soldier”, by Brigadier General C. D. Bruce, C. B. E.

Estimating China's total force now under arms at between two and three millions, the author believes, that the Chinese Republic has the potential human resources for raising armies beside which the forces of

any other power or even two powers would pale into insignificance. As to the soldierly qualities of the Chinaman, the author points out that the "Chinese Regiment" at the time of the Boxer Rebellion demonstrated conclusively that the Chinese soldier efficiently led by Europeans is second to no other Oriental troops. At the same time, the Empress Dowager's troops also proved their mettle in actions against European troops. Among the chief assets possessed by the properly disciplined Chinese soldier, the author names his quite unusual marching powers; his ability to live almost solely on rice with the consequent reduction of transport requirements to an absolute minimum, the absence of drunkenness, and the capacity of the northern troops to stand almost any kind of weather. China's weakness, the author points out, is her lack of leaders. Japanese leaders are trained in the sternest school of self-denial, of Samurai faith and patriotism such as the Chinese leaders have never known. Last, but not least, is the trained staff which is indispensable to the conduct of modern war. China's armies neither have such a staff, nor is it within measurable distance of being created.

INDIA—*The Journal of the United States Service Institution of India*—January, 1933.

"The New Imperialism in Eastern Asia," by Major B. R. Mullaly, 10th Gurkha Rifles.

The underlying motives of Japanese action in Manchuria, the author writes, are still in many quarters imperfectly understood. He believes that the issue has been clouded by talk of oppression of a weak power by a stronger, and of an Imperialistic Militarism, which seized the world economic crisis as a favorable opportunity to further its sinister ends. In his opinion, the plain facts of strategic and economic necessity have been overlooked. The author dismisses as a myth the designs against the Philippines, Australia and New Zealand, frequently attributed to Japan. Although over-population is Japan's greatest problem, the author does not believe it incapable of solution without resort to the desperate expedient of territorial expansion. If such plans were even seriously entertained by Japan, the author finds ample evidence of it having been abandoned in favor of industrial expansion. Industries, however, require raw materials, and Japan is lacking in many of the essentials required by her rapidly expanding industries. Japanese policy in Manchuria is prompted in part by this search for raw materials. The menace of Soviet Russia is another motive behind this policy.

The Japanese fervently believe in the righteousness of their course, the author states, and they regard their country as the only bulwark against Bolshevism in the Far East. She cannot understand American and European attitude in view of all that the Powers have suffered at the hands of China for years. By forestalling Russia in Manchuria, Japan feels she is serving the true interests of civilization. They believe, that a peaceful well-governed Manchuria will not only provide a check on the flow of poison which

is being poured into China, but will also prevent its spread throughout the Pacific and beyond.

Tracing the policy of imperialism of Tsarist Russia, which was prompted by the need for ice-free outlets to the sea, and the consequent development of the Russian sphere of influence in Mongolia, the author shows that Soviet Russia not only continued the Tsarist policy, but by efficient organization succeeded in adding Outer Mongolia to the wall of sovietized states, which she has built up along her Asian borders. Chinese Turkestan, farther to the west, is another great territory within the Soviet program of development. The vast natural resources of that region, according to the author, are to be exploited and made to serve the ends of the new Russian Imperialism. Whether or not Soviet Russia will succeed in Turkestan, as she did in Outer Mongolia, remains to be seen. Its importance to British interests and to China, the author observes, needs no emphasis.

Blocked by Japan in Manchuria, Russia transferred her attention to Mongolia and Chinese Turkestan, and it is there, the author believes, that she is making her preparations for the next stage in that march to the south, which was the keynote of Tsarist Imperialism, and which is the inevitable manifestation of the new imperialism of Soviet Russia. The author quotes the socialist Bertrand Russell's book, "The Problem of China," to the effect, that "the Asiatic expansion of Bolshevik influence is * * * but a continuation of the traditional Russian policy, carried on by men * * * more intelligent, and less corrupt than the officials of the Tsar's regime * * *." The added object of this expansion, the author points out, is to provide a jumping-off ground for a better dissemination of the Bolshevik tenets in the countries beyond.

Under the circumstances, the author concludes. Japan's determination to keep Bolshevism at arm's length from her shores is not at all extraordinary. It is useless, he observes, to evade the fact that Manchuria must be either Russian or Japanese. Russia, once established in that troubled province, would be in a favorable position to carry on her intensive campaign aimed at the disruption of China, and it would better enable her to exploit Japanese labor troubles which are in inevitable concomitants of intensified industrialization.

In the author's opinion, Japan has, by her determined action in Manchuria, delivered a well-timed blow at the new imperialism in Eastern Asia.

JUGOSLAVIA—*Peshadiski Glasnik*—July, August, September, 1932.

"The Military Orator," by Lieut. Col. Svetozar C. Popovitch.

Citing Napoleon's farewell address to his Old Guard, and other addresses by famous military leaders, the author gives expression to the belief, that the military orator still is indispensable, and he points out that the World War presented numerous occasions when commanders were able to influence the outcome of an action by an appropriately worded appeal to their

command. He recommends the cultivation of the art of oratory to all officers.

—*Ratnik*—November, 1932.

"Casualties of Serbia in the Wars of 1912-18", by Col. Mita Petrovich, Med. Corps.

Serbia, with a population of six million, according to the author, called to the colors in connection with the two Balkan wars and the World War not less than 2,784,000 men of whom 1,250,000 made the supreme sacrifice. The casualties in the first Balkan war amounted to 39,000 of whom 5,000 were killed in action; 16,000 more died as the result of wounds or disease. In the second Balkan war 9,000 were killed in battle, 5,000 were victims of the Cholera. The number wounded amounted to 36,000. The World War casualties reached the staggering total of 1,213,000 of whom 52,000 were killed in action, and 807,000 died of wounds or disease. The retreat from Serbia in 1915, cost 138,000 lives, and 306,000 died in Albania. 630,000 deaths are credited by the author to the civil population.

The author gives evidence of great familiarity with American journalistic methods, and a flare for the sensational. He calculates that, in the three wars, Serbia sacrificed 7,800,000 liters of blood, which he states is the equivalent of the load of a freight train 4 kilometers long, consisting of 780 cars of 10-ton (metric) capacity.

SPAIN—*Revista de Estudios Militares*—November, 1932.

"The Soviet Army As I Saw It," by Enrique Diaz.

An interesting account of personal observations of the Soviet army made by the author within the year. He emphasizes the fact that Soviet Russia is a dictatorship in the fullest sense of the word, and that army bears the imprint of that system which is based upon absolute control and discipline. The author states that discipline in the Soviet army is absolute and implicit. He refutes as a myth the oft repeated allegation that there exists no distinction of rank in the Soviet army. The term "tevarish" (comrade) has completely disappeared from the Bolshevik form of address. The salute is obligatory within the barracks compound and upon all official occasions. Members of the same regiment salute at all times, superiors and subordinates doing so simultaneously.

The author writes that military horseshows are as brilliant social affairs as they were in the days of the Tsars. He notes that on one of these occasions he saw General Budeny, famous cavalry leader of the Soviet army, wearing numerous decorations, descend to the arena accompanied by officers of his staff, to felicitate the prize winners while the military band intoned the *Internationale*, Soviet Russia's official anthem. The scene, the author adds, was strangely reminiscent of another day.

The author comments upon the close relationship that exists between soldier and worker, between factory and barracks. It imposes upon the Soviet army a social character that differentiates it from all other

armies. Russia is pervaded by a military spirit, the author states, that is unknown in any other country. "Everything is dictatorized, disciplined, subjected to the unquestionable and unquestioned will of the government," the author writes. "Everything is militarized, the army, the police with its military formations (O. G. P. U. or Tcheka), the factories and civil organizations for both sexes." "Ossoaviachim" is one of these militarized civilian organizations for the promotion of military aviation and chemical warfare. It carries upon its rolls millions of members, males and females.

—*Revista de Estudios Militares*—January, 1933.

"Military Expenses of France," by Anonymous.

An analysis of data compiled by the Spanish General Staff on the subject of French military appropriations. The calculations are based upon the 1930 valuation of the French gold franc. On a comparative basis, appropriations for the land forces, expressed in millions of francs, were as follows:

Year	Homeland	Colonies	Totals
1913	6,380	1,965	8,345
1922	4,600	2,296	6,896
1927	4,200	2,213	6,413
1930	5,050	2,499	7,549

The analyst observes that while the military expenses for the homeland have been reduced by 21% compared with the 1913 appropriations, those for the colonial establishment show an increase of 27%. The sharp reduction shown for 1922 and 1927, the author attributes to economies effected by the use of reserve supplies, retrenchments on repair and maintenance of buildings and installations, and a pay schedule to all ranks materially reduced by the devaluation of the gold franc. On the other hand, the increase shown between 1927 and 1930, the author believes, was due to the necessity of replenishing reserve supplies, and the readjustment of salaries to the actual cost of living. As to colonial troops, the author states increased appropriations were caused partly by the increased cost of supplies, and partly by an actual increase in the authorized strength of the colonial army. Reduction of the term of service with the colors and needs of the newly occupied territories necessitated a corresponding increase in the strength of the colonial establishment.

In 1913 France had only 14 land planes and 8 hydroplanes, hence the author disregards aviation appropriations for that year. Subsequent appropriations were as follows:

1922	1,000	million gold fres.
1927	1,400	" " "
1930	2,140	" " "

The sharp increase is largely attributed to increased cost of production and higher pay schedule for personnel compared to that of land and sea forces. The increase in the number of airplanes in active service in the homeland, the author finds, did not keep pace with the increased appropriations. In 1925, France had 1,180 land and sea planes. By 1930, their number had increased only to 1,210.

NOTES ON RESERVE ACTIVITIES

Washington Chapter, United States Coast Artillery Association

THE Spring meeting of the Association was held at The Danish Rose, 722 17th Street, N.W., Washington, D. C., on April 24th, at 8:30 P. M.

We were favored with having as our Guest Speaker of the evening Sir Wilmot Lewis, noted Washington correspondent of the *London Times*. He gave us a delightful talk on current events, including his estimate of "The New Deal." Sir Wilmot stressed the fact that there could be no economic recovery in world conditions without a restoration of friendly and reciprocal trade relations between all countries.

Light refreshments were served, at the remarkably low cost of twenty-five cents per plate. We are grateful to our president, Captain John Caswell, for all the arrangements, including the rare opportunity of hearing the distinguished speaker.

There were fifty-two members of the Association in attendance, including the Chief of Coast Artillery and most of his staff, Major General Henry M. Todd, Retired, and many officers from all components of the Coast Artillery.

The following guests were in attendance from out of the city:

Lieutenant Colonel Earl W. Thompson, Annapolis;
Lieutenant Colonel James B. Bentley, Laurel;
Captain R. R. Boyer, College Park;
Lieutenant Frank F. Nickels, College Park.

Reserve Activities in the Baltimore Area

BY authority of Special Orders No. 32, Headquarters, Third Coast Artillery District, Fort Monroe, Va., dated October 1, 1932, the 914th Coast Artillery (AA) came into being.

There are twenty-nine officers assigned to the regiment. The Commanding Officer is Lieutenant Colonel James B. Bentley, who is Headmaster of the Avondale Country School at Laurel, Maryland. Colonel Bentley is a veteran Reserve Officer, having been continuously a member of the Reserve Corps since its inception. He has taken a very active interest in his regiment since its organization, and by personal correspondence with his officers has been largely responsible for the excellent attendance at the monthly conferences.

The following is an extract from a letter from the Colonel to all of his officers upon the organization of the 914th:

"My assignment to the 914th C. A. (AA) is a great satisfaction and pleasure to me and I trust that all of you feel the same about your orders."

"Doubtless all of us have had pleasant associations

with our old regiments but I think that you will agree with me that an All-Maryland unit will give greater opportunities than could be hoped for in a scattered command.

"The 914th offers to each of us, individually and collectively, privileges that we would not be able to enjoy if we were assigned to regiments outside of our State. The fact that we are all neighbors should foster a splendid morale and our Reserve work should be of far greater interest and profit.

"A few of you I know; some slightly, others intimately. I trust that as time goes on I may have the privilege of knowing all of you, and I feel sure that I shall have your enthusiastic and loyal support in all pertaining to the good of the Service. * * *

"The Army is in a tough spot during these uncertain days, and I am sure that all of us who are interested in its welfare will do our part."

Conferences have been held the third Wednesday of each month, in the magnificent new Post Office and Court House in Baltimore. Officers of other arms and services are always welcome. At the December conference the attendance was thirty-five,—this is more than the total strength of the regiment.

The following officers of the regiment have conducted conferences, in the subjects indicated:

"The Antiaircraft Command," Lieutenant Colonel Bentley;

"The Harbor Defense Command," Captain Albert W. Sparrow, Jr.;

"Marches and Convoys," Captain Roswell R. Boyer;

"Staff and Logistics of the Division," Captain Gordon L. Bowles.

At the December meeting, Lieutenant Colonel Harry P. Newton, of the 917th, visited us from Washington, and read an interesting paper on "Night Operations."

The Unit Instructor, Major Gray, with Headquarters in Washington, has attended every conference, and given short talks on appropriate subjects following the regular programs.

To illustrate the esprit of the officers of the regiment residing some distance from Baltimore, at the April meeting Captain John W. Fisher, who is principal of the high school at Westernport, Maryland, drove 165 miles, from that city, for the sole purpose of attending the meeting. At the November meeting, Lieutenant Paul K. Monaghan drove from Centerville, on the Eastern Shore, a distance of 105 miles. Captain Walter C. Summer, who resides at Cascade, Maryland, 55 miles away, has only missed one meeting.

The 914th is the only Coast Artillery regiment in Maryland.

The officers of the regiment are looking forward to the first period of active duty of the regiment, in the Summer of 1934.

PROFESSIONAL NOTES

An Adventure in Gadgeteering

Development Work in Searchlighting Undertaken
by Capt. A. M. Jackson, CAC

By 1st Lt. Burgo D. Gill, 62d C.A.

THE purpose of this article is a dual one. Firstly, it will be shown that many ideas must be tried out in an endeavor to reach a certain goal. Secondly, as an example of what an inventor is up against in devising a new "gadget," Captain A. M. Jackson's work for the improvement of the present standard searchlight section, extending over a period of a year and a half, will be of interest.

The present searchlight unit is a worthy piece of apparatus. However, after one has drilled with it several times certain shortcomings will be evident. It is easy to understand why there is trouble in making the listeners "listen" without craning their necks to look into space. The same applies to the comparator operators. Next, the acoustic corrector is not all that one might desire. Besides these difficulties which amount to one and the same thing, there is another that becomes more troublesome each day; namely, the silencing of airplanes. The quieter the plane, the harder the job. Besides that nightmare, we have the worry of picking up low flying planes and for this purpose sound locators are not effective.

To solve these problems, Captain Jackson first tackled the one concerned with searching. Obviously, if this could be done inexpensively by mechanical means, it would be better than depending on two operators whirling their operating handles back and forth attempting to swing the beam in a three degree circle about the point in space indicated by the "long horns." Thus the first step in the improvement of the Duplex unit was undertaken.

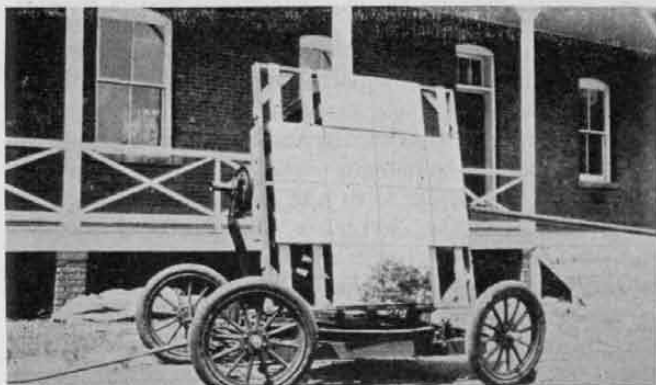
This was accomplished by setting the light upon a platform operated by three cams, actuated by an electric motor. When "In Action" was given, the oscillating motor was started and the light mechanically swept out a three degree arc in space. This was first put into use at Mitchell Field, during the target practice of Battery A, 62nd C. A., under Captain Jackson's command in the summer of 1931.

This oscillator, called the "wobble-ator" by the troops, was successful enough to warrant further trials. It was tested in conjunction, and in competition, with a standard light and the Sperry "Italian" unit at Fort Humphreys, Virginia, during the Antiaircraft-Air Corps maneuvers and tests held at that place in the fall of 1931. The oscillator picked up approximately fifty per cent of the targets that the three sections attempted to illuminate. As a result of these maneuvers, three more oscillators were ordered built.

After the conclusion of these trials, Captain Jackson, not being fully satisfied with the results of his first gadget, tackled the problem from another angle. This gave birth to the second oscillator, popularly called the "outboard motor" by the battery (trust them for that). This oscillator was built to enhance the sweeping power of the light by causing it to sweep out a spiral from zero to the circumference of a circle whose diameter is subtended by an arc of four and one half degrees.

This second gadget was mounted on the face of the acoustic corrector. It consisted of two cams mounted on top of each other just a little lower than the center of the corrector face. An arm was mounted on each of the azimuth and altitude corrector knobs and held against its respective cam by a spring. The two cams are turned by "man power," causing the data rotors to move back and forth. If the comparator operators now match the pointers, which carry the listener data plus the oscillator data, the searchlight beam will describe a spiral in space.

This was only tried out in the daytime. The possibilities were merely tested by viewing through the



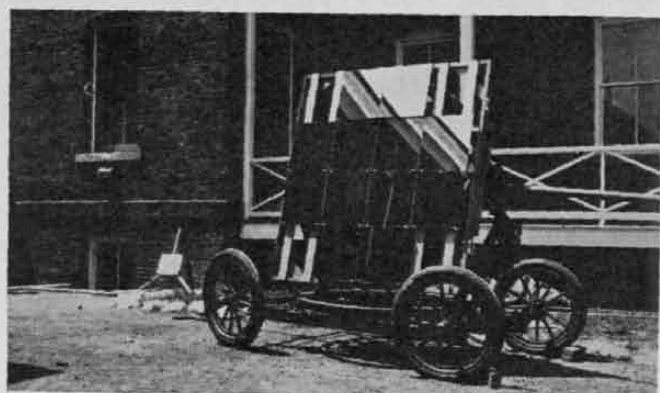
Model Multiple Reflector, Beam Splitter.

daylight peep sights the action of the light. The spiral effect was obtained.

Before this second development was put into use, another idea, a better one, was thought out. Up to this time, it will be noted that Captain Jackson had really only tackled the problem of "searching" in his development. He next attempted to eliminate the necessity of searching and listening as well.

A beam disseminator was suggested. This beam "splitter," (the battery again at work with its own lingo), was mounted on a model 1918 light carriage and frame after the head and mirror had been removed. A wooden frame was suspended on the trunnions. On this frame were mounted sixteen mirrors so fastened that if a beam was thrown upon them, an illuminated square would be formed with four beams to the side.

This "stunt" was accomplished by setting up the beam splitter about 45 feet in front of the Duplex light whose beam was brought to the horizontal and made to fall upon the disseminator or multiple reflector. Searching was accomplished, without any sound locator or comparator, by shifting the beam splitter by means of the hand control. The operator depended upon his judgment as to where to search for the target. Two Duplex lights were also used which gave a rectangle of thirty-two small beams. The result was interesting from a pyrotechnic or show effect, but that was all. There were too many lights in the sky for one pair of eyes to cover. Furthermore, the bottom and side row of beams blanketed whatever the other beams might pick up. Thus, the third development was



First Multiple Reflector Showing Only Twelve Mirrors Mounted.

relegated to the store room where it gathers dust except when used for demonstrations and similar "flower shows."

This third instrument did accomplish one thing for Captain Jackson's benefit. As a result of illumination tests conducted with the beam splitter, it was found out that the current of 150 amperes was not sufficient to properly illuminate a plane at ranges used in target practice and what might be expected under service conditions. Therefore, when the fourth gadget was tried out (and as a result of a conference with the Sperry representative who stated that the power plant would not be overloaded if the extra current was used provided the data transmission devices were not needed) the current was increased to 180 amperes. This was made possible by using special carbons obtained from the Sperry plant.

The fourth device, and this one begins to take shape as a permanent development, consisted of a beam splitter mounted directly on the face of a standard Sperry light. Only nine mirrors were used this time and all were to be placed in line, hence no beam could blanket another unless the observer was directly under the line of lights.

Nine plate glass mirrors (it is hoped that rhodium plated ones will be used in the future) were mounted on a duralumin frame. This frame was bolted at a forty degree angle to the face of the light. Counterbalances of lead were suspended at the rear of the light. When the light was vertical, the projected rays from the disseminator showed horizontal, and vice versa. At

first, it was undecided whether to use the beams vertically or horizontally. It was thought that the altitude of the target could be easily bracketed by the beams three degrees apart, then the beam splitter would have to be searched in azimuth only.

The results were quite interesting. It will be remembered that no sound locator was used, the unaided ear alone was depended upon. This device was tried out upon a tri-motored Fokker transport plane whose ground speed was approximately ninety-five miles per hour, altitude eight thousand feet, weather good and the atmosphere clear.

Course	Angular Altitude mils	In Action to Pick-up, Seconds	Horizontal Range to Point of Pick- up (All in Front)
1	361	30	2960
2	294	2 flicks in 5 seconds failed to cover	3500 (about)
3	404	26	3940
4	360	45	4240

The criticism might be made that the time is nothing to brag about. However, these results were obtained with an untrained crew the first night the instrument was used. Again, it will be noted that the ranges compare favorably with target practice results. Thirdly, from the angular altitudes, it will be observed that "In Action" was ordered at a much lower angular altitude than one used for target practices.

After this initial success, a comparative test was held for distance, or illumination.

Course	Type of Light	Horizontal Range (Fade Out)
1	Multiple Reflector (disseminator)	7200
2	Standard, MIV	8800
3	Multiple Reflector	6300
4	Standard, MIV	7200
Average MIV 8,000		Average, M.R. 6750

The loss in efficiency is about 15 per cent, but the offset to this is the probable value of the nine beams against one, and the use it can be put to without the sound locator.

If the multiple reflector works, it will be possible to do away with the present sound locator. However, at this point, a simple sound locator, for azimuth only, was made of two conical wooden horns separated by about eight feet and mounted upon a tripod. It worked. The next step was to mount this on the controller. When the listener tracked the target using the controller handwheel to get on with his horns, the light was automatically kept on the target in azimuth without the data going through the intermediary of the acoustic corrector and comparator.

The problem next to be solved is to connect up these ideas into a complete unit. The standard light, with the multiple reflector mounted on it, was hooked up to the distant electric controller which had the miniature sound locator attached. If an acoustic corrector is desired for the sound locator, use can be made of the "trombone" corrector with which the azimuth horns are equipped.

This corrector is nothing more than two pieces of brass tubing sliding one within the other. Lengthening or shortening these tubes changes the apparent position of the sound source. This principle is used in the "trainer" for listeners.

One apparently difficult problem encountered at this time was soon overcome. It is easy to mount a pair of horns on the controller and have the horns and the light follow each other by turning the azimuth hand-wheel. The horns and the controller base are an integral part of each other, hence the controller box turns when the azimuth wheel is rotated. But, how is the altitude for the light and the horns to be kept in step? The altitude operator, who both listens and looks, has a peep sight that always points in the direction of his horns. He merely turns his elevation handwheel until he sees the center beam in the middle of his field. To use this outfit is simple. The azimuth operator does all the searching. The altitude operator knows when he is approximately on the target. The spread of the

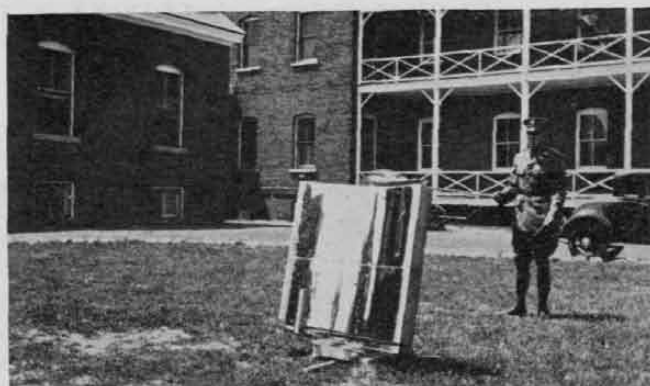


First Model of the Miniature Sound Locator.

nine beams bracket is sufficient to cover any incoming plane.

This last development has not been thoroughly tested. If it works, it will accomplish two things, first reduce the number of men in a searchlight section from eleven to eight, second, do away with the cumbersome sound locator. In addition the entire data transmission device can be discarded.

So far, nothing has been said about the solution of the problem in connection with the illumination of low flying planes. It will be recalled that all searchlight batteries have outlying listeners two to five thousand yards in front of each light. If the number of listeners is increased and each post is equipped with a simple device for illuminating low flying planes, the problem for the light section is rendered extremely simple. A gadget was devised for these listeners. It consists of a sheet of chromium plated brass, curved into a parabolic reflector. A wing tip flare was mounted in front of this (perhaps some other pyrotechnic squib might be better). When the plane is heard nearly overhead, the listener can instantaneously set off his squib by means of a "hot shot" battery. He can search with this flare illuminator by means of two pieces of rope attached to a cross arm for the reflector is pivoted on a pintle in such a way that it can



Pyrotechnic Illuminator for Low-flying Planes.

be moved in any direction. Experiments with this device have been quite successful. It is intended to give it further tests at the Antiaircraft-Air Corps maneuvers at Fort Knox.

In closing, it will be hoped that no undue claims are made. This article has a dual purpose, to point out the many forms an idea may take in being "hatched," and to show that the present searchlight development is by no means perfect.

251st Coast Artillery Active in Los Angeles Earthquake

THE work of the 251st Coast Artillery, Calif. N. G. following the earthquake which shook the Los Angeles sector on March 10th, last was just what could be expected of that organization. It was particularly gratifying to note that the 2d Battalion carried thru in the emergency without a hitch. A glance at the record of events is illuminating.

March 10, 1933—P. M.:

5:55—Earthquake.

6:14—Call to all Guardsmen broadcast over KGER.

6:19—Field telegram to Adjutant General, notifying him of the disaster.

6:30—Twenty-two Reserve Officers and 31 civilian advisors (named in emergency plan) report to Major Harris.

6:35—Captain Oertley reports 2 officers and 47 men in uniform, equipped and ready. (Every man a graduate of 14 weeks course in first aid.)

6:40—Seventy-six men (1st Aid Squads) sent out.

6:47—Station W6GSR, Tom Morrissey, designated official radio station.

7:10—Complete mobilization of battalion effected.

7:30—Received reports from 12 attached reserve officers.

The story continues with the account of the conversion of the Armory into an emergency station with 9 physicians, 15 nurses and 2,300 aid cases handled. The Battalion also fed and housed numberless refugees and in other ways justified their training and existence. This is merely another example of what the Army does beside fight. Congratulations to all for the fine showing for promptness and efficiency.

COAST ARTILLERY ACTIVITIES

Office of Chief of Coast Artillery

Chief of Coast Artillery
MAJOR GENERAL JOHN W. GULICK

Executive
COLONEL W. F. HASE

Personnel Section
MAJOR G. F. MOORE
MAJOR S. S. GIFFIN

Materiel and Finance Section
MAJOR R. E. HAINES
MAJOR O. L. SPILLER
MAJOR J. H. COCHRAN

Organization and Training Section
MAJOR E. E. BENNETT
MAJOR F. P. HARDAWAY

Plans and Projects Section
MAJOR G. R. MEYER
MAJOR R. V. CRAMER

Hawaiian Separate Coast Artillery Brigade News Letter

BRIGADIER GENERAL ROBERT S. ABERNETHY,
COMMANDING

CHIEF OF STAFF, COLONEL ARTHUR L. FULLER, C. A. C.
S-1 LT. COL. W. V. CARTER, A. G. D.
S-2 CAPTAIN E. T. CONWAY, C. A. C.
S-3 MAJOR A. G. CAMPBELL, C. A. C.
S-4 MAJOR F. A. MOUNTFORD, C. A. C.

HAWAIIAN Department Maneuvers were conducted from January 27 to February 9, 1933. The exercises were unusually interesting insofar as the tactical problems were concerned, but most uncomfortable and disagreeable in their latter stages because of heavy rainfall. Who can remember a maneuver when it did not rain?

The first stage of the maneuvers were local joint exercises with the naval forces at Pearl Harbor against an invading Black Naval Force represented by the Scouting Force of the United States Fleet. The latter consisted of two aircraft carriers, seven cruisers, and thirteen destroyers.

This phase of the maneuver was of great value because of the cooperation between the Army and Naval forces in Hawaii. Army and Navy boats maintained an offshore and inshore patrol, aircraft worked together in performing coordinated aerial reconnaissance missions. Communication systems were combined, eliminating lost motion and unnecessary duplication. This close cooperation enabled officers of both services to gain a better knowledge of the others' problems also an insight into the tactical work and dispositions, especially was this true in the handling of aircraft.



COMMANDING GENERAL AND STAFF, HAWAIIAN SEPARATE COAST ARTILLERY BRIGADE, FORT DE RUSSY, T. H., MARCH 1, 1933.

Front row (left to right): Major A. J. Campbell, Colonel A. L. Fuller, Brig. Gen. R. S. Abernethy (Commanding), Lt. Col. W. V. Carter (AGD), Major F. M. Mountford.

Rear row: Captain G. F. Unmacht (CWS), Captain E. T. Conway, Captain E. B. Schlant (JAGD), Captain O. D. Bowman, First Lieutenant J. V. deP. Dillon.

The second phase of the maneuver was a communication exercise. A rigid test of all communication systems was conducted by the Department Commander, Major General B. H. Wells, and his staff, with satisfactory results. An interesting illumination test was conducted off the shores of Oahu against mine sweepers and mine layers to test the tactical principles regarding the use of searchlights, and to give the personnel manning the seacoast searchlight batteries an opportunity to observe targets under service conditions.

In the third phase a large enemy force effected a landing on Oahu and the Hawaiian Department, organized as a Corps, proceeded to operate against the "enemy" represented by "dead" enlisted men—military police, etc.,—carrying white flags or pennants.



64th Coast Artillery (AA) Passing Reviewing Stand, Hawaiian Department Review, February 20, 1933
(Colonel R. H. Williams, Commanding).

Troops were actually moved wherever possible so that staff officers had to interrupt bridge games occasionally to do some logistics. Even the Judge Advocate and the Adjutant General on the Coast Artillery Brigade Staff were assigned tactical duties during the "emergency." The enemy seemed to be able to advance in spite of all we could do to stop him. Old Jupiter Pluvius was right on the job and caused far more discomfort than the Blacks or Reds or whatever the "Brass Hats" called them.

Ex-Secretary of War, Newton D. Baker, Mrs. Baker, and their daughter, Betty, visited Hawaii recently for a rest. He was received with all the honors due him as Ex-Secretary of War and one of the nation's greatest. Major Monte Hickok, with the 1st Battalion, 16th Coast Artillery, formed an Escort of Honor for the former Secretary on his arrival and departure. Mr. Baker was swamped with hundreds of invitations, both official and personal, but he accepted only four. One of them was to review the Army personnel in the Hawaiian Department with all materiel that could be moved economically. Twelve thousand crack soldiers passed the reviewing stand that day. The Coast Artillery, with the 64th Antiaircraft Regiment, under the command of Colonel Richard H. Williams, brought up the rear of the long column. This was the first time this armament had passed before such a large gathering—composed of eight or nine thousand persons. On one occasion, when an old F. W. D., with hard rubber tires, towing an antiaircraft gun trailer, stopped in the soft slippery surface mud with its wheels spinning, the cannoneers jumped out and shoved the old antique along until it regained its place in the formation. Mr. Baker gave the gun crew a special salute and a big smile as if to say: "That's the way they did in 1918, Boys!" Colonel Homer B. Grant's composite regiment consisting of the 15th, 41st, and 1st Battalion of the 55th Coast Artillery, and Colonel Harry L. Steele's

composite regiment consisting of the 16th and 2d Battalion of the 55th Coast Artillery, looked very smart. The Coast Artillery, formed as infantry, were in line of close lines, with fixed bayonets, chin straps, and white gloves. Their marching and dressing was excellent. Their appearance created much favorable comment not only from the spectators, but from members of other branches as well.

Fort Shafter outfighting a determined Fort Kamehameha team won the boxing championship of the Brigade with the Harbor Defenses of Honolulu finishing third. The final team scores and individual weight champions are as follows:

Fort Shafter	1162½ points.
Fort Kamehameha	897½ points.
Harbor Defenses of Honolulu	445 points.

Pfc. Fredette	Ft. Kamehameha	Bantamweight.
Pfc. G. Smith	Ft. Shafter	Featherweight.
Cpl. J. Twigg	Ft. Shafter	Featherweight.
Pfc. Geo. Winegar	Ft. Shafter	Lightweight.
Cpl. Malec	Ft. Shafter	Lightweight.
Pvt. Walter Strappel	Honolulu	Welterweight.
Cpl. Zasinovich	Ft. Kamehameha	Middleweight.
Cpl. Rogers	Ft. Kamehameha	Light-heavyweight.
Sgt. Durant	Ft. Kamehameha	Heavyweight.

All of the posts are conducting inter-battery track meets to develop track and field material for the Honolulu Sector meet. Battery I, 64th C. A., commanded by Captain Arthur W. Waldron, romped off with the Fort Shafter competition, while Headquarters Battery, 15th C. A., commanded by Lieutenant John W. Dwyer, won the Fort Kamehameha meet. The winner of the Honolulu Defenses meet has not been determined at this writing.

Lieutenant Joe Dillon, the Sector Athletic Officer, has designed a handsome athletic supremacy trophy to be awarded annually to the post standing highest in the competition in the five major sports, i. e., boxing, swimming, basketball, baseball, and track and field. Lieutenant "Sandy" Goodman, athletic officer

at Fort Shafter, is working hard to maintain the lead the 64th has established in competition for this prized trophy.

A new mess chart has been devised for use in the 28 messes in the Brigade. The chart is simply constructed and was created to enable inspecting officers and battery officers to determine whether proper menus were being used. The chart also helps greatly to educate the personnel in the mess with reference to the mysteries of "variety," "balanced diet," "protein," "alkaline base," "vitamin C," and etc. Much favorable comment has been received on the construction and the use of the new chart, not only from Army dietitians, but from civilian experts as well.

During the first four months of the "malahini" officer's stay in Hawaii, he is required to visit certain observation points, remote gun positions, and other points of tactical interest which are invariably located at the tops of mountains. The officer whose physical exertion during the past four years has been confined to swinging a swivel chair, walking or other mild forms of exercise, certainly pays for his folly. These hikes are called "terrain reconnaissances," but they are also known by other names not fit to print. One thing is certain, officers have a more thorough knowledge of these landmarks because they have been known to repeat them frequently in their mutterings while they are avoiding the sticky algaroba and cactus and perspiring on all sixteen.

Two hundred sixty-two West Point Graduates, many of them Coast Artillery men, assembled at the Alexander Young Hotel in Honolulu on Saturday, March 18th, to celebrate the 131st anniversary of the founding of the Military Academy. Brigadier General R. S. Abernethy was chairman of the committee in charge. He was ably assisted by Lt. Col. W. V. Carter, Major M. J. O'Brien, Captain E. W. Timberlake, and Lieutenant John R. Lovell. According to the most coherent reports, everyone had a good time.

All organizations are busily engaged in preparation for the spring and summer target practices. Lieutenant Breitung, commanding Battery Harlow with Battery C, 16th Coast Artillery (12" S. C. M.) starts the big show March 29th. Seacoast target practices continue through June with the antiaircraft firing activities continuing well into the summer months. It is hoped the Hawaiian Separate Coast Artillery Brigade will fare as well as they did last year when the first battalion of the 15th Coast Artillery won the Coast Artillery Association trophy.

Captain George F. Unmacht recently joined the Brigade staff as Brigade Chemical Officer. Captain Unmacht is very active in Masonic work, being the National Secretary of the National Sojourners, an organization of officers and ex-officers, regulars and reserve, of the uniform forces of the United States. Honolulu Chapter No. 11, has many Coast Artillery officers on its rolls and meetings are sometimes held at the various posts of the Brigade.

We congratulate Major Lawrence C. Mitchell, First Lieutenants Edwin Chamberlain, and John R. Lovell

on their payless promotions. New arrivals in the Hawaiian Brigade include Lieutenant John L. Goff, Captains M. C. Handwerk, K. C. Bonney, Lieutenant H. R. Martindell, and S. M. Mellnick. Recent departures include Captains A. L. Lavery, LeRoy Lutes, W. J. Gilbert, Maitland Bottoms, Fred B. Waters, Lieutenants B. F. Dice, R. Haggerty, C. G. Calloway, Carl Fernstrom, H. duB. Lewis, Walter J. Wolfe, and C. J. Odenweller.

Reward for Long and Faithful Service

NOT the least among the advantages which accrues to an individual from long and faithful service in the military establishment is the right to retirement. This is not an unmixed benefit for all concerned because it means a loss to the service of men of demonstrated worth and merit. Especially is this true of three master sergeants, Coast Artillery Corps, members of the Coast Artillery School Detachment of Fort Monroe, Virginia, who have recently been placed on the retired list. These men are well known to the majority of Coast Artillerymen especially those who have been connected in any capacity with the Coast Artillery School during the past decade.

The sergeants placed upon the retired list are:

MASTER SERGEANT ALFRED J. JOHNSON

MASTER SERGEANT LEON H. DAVID

MASTER SERGEANT THOMAS J. STEPHENS

Master Sergeant Johnson first entered the service on October 4, 1902. He was made a noncommissioned staff officer July 1, 1909, and has served continuously as a noncommissioned officer from that date, except during the World War when he was commissioned as a 2d Lieutenant Coast Artillery and rose to the grade of Captain in the Army Service Corps, from which he was discharged October 18, 1919. He holds nine discharges from the Army, all with character "Excellent." Since October 13, 1912, Master Sergeant Johnson has been in charge of the printing plant of The Coast Artillery School. Many volumes of the COAST ARTILLERY JOURNAL and much of the training literature issued by the School since 1912 has been prepared under his immediate supervision.

Master Sergeant David entered the Army on October 15, 1904, and rose to the grade of noncommissioned staff officer on October 26, 1906, serving continuously in that capacity until the date of his retirement except during the war when he held a commission, as 2d Lieutenant, Q.M.C., from which he was honorably discharged on October 24, 1919. He has been an instructor in the Department of Enlisted Specialists, Coast Artillery School, since 1929. A natural teacher, fully familiar with his subjects, his work with the school has been of the highest order. He holds eleven discharges from the Army, all with character "Excellent."

Master Sergeant Stephens joined Company C of the 28th Infantry on February 21, 1901, later transferring to the Coast Artillery Corps in which arm he rose to the grade of noncommissioned staff officer on February 4, 1914, serving continuously in that capacity

until the date of his retirement. He is the holder of eight discharges from the Army, all with character "Excellent." Master Sergeant Stephens has been on duty with the Coast Artillery Board since July, 1914. During that time he has rendered invaluable assistance in designing and constructing many experimental fire control devices. The Predictor MI, the Universal Deflection Board and the Stephens Antiaircraft Plotter are developments of original ideas advanced by Master Sergeant Stephens, while in general, the design of practically all plotting room fire control equipment used by the Coast Artillery has been influenced by his knowledge and ability.

The services of these noncommissioned staff officers have been honorable and faithful, a worthy example for emulation by their comrades. At all times they have given their best, and this has been an inspiration to all those with whom they came in contact.

General Malin Craig Inspects 250th C. A.(AA), Calif. N. G.

ON April 12th, General Malin Craig paid a visit to the 250th Coast Artillery. He was the guest of the officers at dinner. Following this there was an elaborate CPX, a parade and some ceremonies by the Third Battalion. General Craig made a thorough inspection of the Armory and expressed himself as being well satisfied with the neatness, order and general efficiency of the regiment. After the inspection the following letter was written to the Adjutant General, State of California:

"As a result of the Corps Area Commander's inspection of the 250th Coast Artillery, California National Guard in San Francisco, April 12, 1933, you are informed that he was very much pleased to note the generally excellent condition of the regiment, equipment, training, readiness for active field service and storage arrangements."

San Francisco Chapter, Coast Artillery Association

OUR San Francisco correspondent reports that the local chapter of the Coast Artillery Association is planning to hold one of the big social events of the season to consist of a buffet supper dance at which the ladies will be honor guests. These functions have heretofore proved uniformly popular and have been the means of providing entertainment, sociability and a strong bond of cohesion among the members of the chapter. Members are urged to bring their own wives, if possible, if not a substitute wife, or wife to be. In preparing for this event the committee on arrangements has been guided by popular request in the matter of entertainment and in order to minimize the expense they have refrained from hiring paid talent. However, we are informed confidentially that the entertainment features will not be overlooked and that every one is promised a good time. Through the courtesy of the local authorities the Officers Club at the Presidio has been made available. Other chapters will do well to follow the example set by the San Francisco chapter.

Date of Organization of Various Artillery Batteries

<i>Present Designation</i>	<i>Original Designation</i>
1776—Battery D, 5th Field	Alexander Hamilton's Battery
1786—Battery D, 4th Coast Artillery	Burbeck's Company of Artillery
1792—Battery D, 1st Field	Porter's Company of Artillery
1794—Battery D, 6th Field	Captain John McClelland's Company Corps Artillery
Battery D, 3d Coast Artillery	Mitchell's Company Corps of Artillerists and Engineers
Battery B, 3d Coast Artillery	Kalteisen's Company Corps of Artillerists and Engineers
Battery E, 3d Field	Thompson's Company Corps of Artillery
1798—Battery D, 2d Coast Artillery	Henry's Company, 2d Regiment of Artillerists and Engineers
Battery A, 1st Coast Artillery	Gates' Company, 2d Regiment of Artillerists and Engineers
Battery H, 2d Coast Artillery	Read's Company, 2d Regt. of Artillerists and Engineers
Battery E, 3d Coast Artillery	Barron's & Huger's Companies, 2d Regt. Artillerists and Engineers
Battery B, 62d Coast Artillery	Irvine's Company, 2d Regt. Artillerists and Engineers
Battery D, 3d Field	Wadsworth & McRae Companies, 2d Regt. Artillerists and Engineers
1808—Battery A, 51st Coast Artillery	Chandler's Company, Regt. of Light Artillery
Battery E, 62d Coast Artillery	George Peter's Company, Regt. of Light Artillery
1810—Battery C, 2d Coast Artillery	Beall's Company, Regt. of Artillerists.
1812—Battery C, 4th Coast Artillery	Barker's Company, 2d Regt. of Artillery
Battery B, 1st Coast Artillery	Crane's Company, 3d Regt. of Artillery
Battery A, 3d Field	Donoho's Company, 3d Regt. of Artillery
Battery E, 4th Coast Artillery	Hawkin's Company, 2d Regt. of Artillery
Battery A, 3d Coast Artillery	Jones' Company, 3d Regt. of Artillery
Battery E, 1st Field	Ogden's Company, 3d Regt. of Artillery
Battery F, 1st Coast Artillery	Lieut. Robert R. Ruffin's Company, Corps of Artillery
Battery C, 3d Coast Artillery	Russell's Company, 2d Regt. of Artillery
Battery C, 62d Coast Artillery	Smith's Company, 2d Regt. of Artillery
Battery I, 2d Coast Artillery	Stockton's Company, 3d Regt. of Artillery
Battery B, 2d Coast Artillery	Towson's Company, 2d Regt. of Artillery
1813—Headquarters 1st Coast Artillery	Melvin's Company, Light Artillery

1st, 2d, 3d, 4th Regts. Artillery organized 1821; 5th, 1861; 6th and 7th, 1898. Field Artillery separated 1901 and organized in regiments (six) in 1907.

COAST ARTILLERY ORDERS

Colonel John T. Geary to 9th Coast Artillery District, Presidio of San Francisco instead of Ft. Winfield Scott.

Colonel William H. Wilson, General Staff Corps, War Department, Washington, to 11th, Ft. H. G. Wright, June 15.

Colonel Robert F. Woods, retired, April 30, on account of physical disability

Lt. Col. Clair W. Baird, student, Army Industrial College, Washington, to student, Naval War College, Newport, July 1. Previous orders revoked.

Lt. Col. Sanderford Jarman, instructor, U. S. Military Academy, West Point, to student Army War College, Washington, August 15.

Lt. Col. Allen Kimberly, instructor, National Guard, New York, to student, Army War College, August 15.

Lt. Col. Hugo E. Pitz transferred to Quartermaster Corps, April 5.

Lt. Col. John E. Pratt, instructor, C. & G. S. School, Ft. Leavenworth, to student, Army War College, Washington, August 15.

Major Leonard R. Boyd, Inf., instructor, C. A. School, Ft. Monroe, to student, C. & G. S. School, Ft. Leavenworth, August 21.

Major Charles W. Bundy, instructor, C. A. School, Ft. Monroe, to student, Army War College, Washington, August 15.

Major John H. Cochran, office of Chief of Coast Artillery, Washington, to instructor, C. A. School, Ft. Monroe, August 1.

Major Reginald B. Cocroft, Historical Section, Army War College, Washington to Historical Section, Army War College, Paris, sailing New York, July 26.

Major Edgar B. Colladay, office of The Assistant Secretary of War, Washington, to U. S. Military Academy, West Point, June 20.

Major J. F. Cottrell, 3d, Ft. Rosecrans to Army Industrial College, Washington, sailing San Francisco, August 1.

Major Bird S. DuBois, student, Army War College, Washington, to 6th, Ft. Winfield Scott sailing New York, June 20.

Major Christian G. Foltz, Office Chief of Militia Bureau, Washington, to student, C. & G. S. School, Ft. Leavenworth, August 29.

Major James L. Hayden, student, C. A. School, Ft. Monroe, to 14th, Ft. Worden, sailing New York, June 20.

Major Dale D. Hinman, instructor, C. A. School, Ft. Monroe, to student, Army War College, Washington, August 15.

Major Carl E. Hocker, librarian, C. A. School, Ft. Monroe, to 2d, Ft. Monroe, July 19.

Major James C. Hutson, instructor, Delaware National Guard, Dover, to student, C. A. School, Ft. Monroe, September 8.

Major Richard M. Levy, student, C. & G. S. School, Ft. Leavenworth, to 13th Ft. Barrancas, June 30.

Major John H. Lindt, 13th, Ft. Barrancas, to student, Army War College, Washington, August 15.

Major Cedric F. Maguire, from recruiting, Providence, to student, C. A. School, Ft. Monroe, September 8.

Major John B. Martin, instructor, New Hampshire National Guard, Concord, to 13th, Ft. Crockett.

Major George F. Moore, Office of Chief of Coast Artillery, to student, Army War College, Washington, August 15.

Major Harold F. Nichols, student, Army War College, Washington, to 13th, Ft. Barrancas, July 1.

Major Homer R. Oldfield, student, Air Corps Tactical School, Maxwell Field, Montgomery, to 63d, Ft. MacArthur.

Major John S. Smylie, Philippines, to student, Army Industrial College, Washington.

Major Rollin L. Tilton, Secretary, C. A. School, Ft. Monroe, to student, C. & G. S. School, Ft. Leavenworth, August 29.

Captain Elvin L. Barr, previous orders to Quartermaster School, Philadelphia, revoked.

Captain Roy T. Barrett, 2d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

Captain James C. Bates, student, C. A. School, Ft. Monroe, to 6th, Ft. Winfield Scott, sailing New York, June 20.

Captain Benjamin Bowering, student, C. & G. S. School, Ft. Leavenworth, to 62d, Ft. Totten, June 30.

Captain James D. Brown, student, C. A. School, Ft. Monroe, to 61st, Ft. Sheridan, June 30.

Captain Henry D. Cassard, 51st, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

Captain Frederick R. Chamberlain, Jr., 52d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

Captain Hugh McC. Cochran, 3d, student, C. A. School, Ft. Monroe, to 13th, Ft. Barrancas, June 30.

Captain Leon C. Dennis, student, C. A. School, Ft. Monroe, to 52d, Ft. Hancock, July 5.

Captain William H. Donaldson, Jr., U. S. Military Academy, West Point, to student, C. & G. S. School, Ft. Leavenworth, August 29.

Captain Fenton G. Epling, student, C. & G. S. School, Ft. Leavenworth, to 62d, Ft. Totten, June 30.

Captain Lloyd W. Goeppert, student, C. A. School, Ft. Monroe, to 63d, Ft. MacArthur, sailing New York, June 20.

Captain John H. Harrington, student, C. A. School, Ft. Monroe, to instructor, Delaware National Guard, Wilmington.

Captain Charles S. Harris, student, C. A. School, Ft. Monroe, to 51st, Ft. Monroe.

Captain Milton Heilfron, student, C. A. School, Ft. Monroe, to 62d, Ft. Totten, June 30.

Captain Charles W. Higgins, instructor, C. A. School, Ft. Monroe to Hawaii, sailing New York, June 20.

Captain Ralph E. Hill, R. O. T. C., Va, Agric. & Mech. College and Poly. Institute, Blacksburg, to student, C. A. School, Ft. Monroe, September 8.

Captain George W. Hovey, student, C. A. School, Ft. Monroe, to 13th, Ft. Barrancas, June 30.

Captain James P. Jacobs, student, C. A. School, Ft. Monroe, to 52d, Ft. Monroe.

Captain Joseph P. Kohn, student, C. A. School, Ft. Monroe, to 13th, Ft. Barrancas, June 30.

Captain William F. Lafrenz, student, C. A. School, Ft. Monroe, to Hawaii, sailing New York, June 20.

Captain John T. Lewis, Coast Artillery Board, Ft. Monroe, to student, C. & G. S. School, Ft. Leavenworth, August 29.

Captain Porter P. Lowry, R.O.T.C., University of Cincinnati, to student, C. & G. S. School, Ft. Leavenworth, August 29.

Captain George C. McFarland, student C. A. School, Ft. Monroe, to 11th, Ft. H. G. Wright, June 30.

Captain Howard S. MacKirdy, student, C. A. School, Ft. Monroe, to 62d, Ft. Totten, June 30.

Captain William F. Marquat, student, C. & G. S. School, Ft. Leavenworth, to instructor, New Hampshire National Guard, Concord, June 15.

Captain Bryan L. Milburn, instructor, C. A. School, Ft. Monroe, to student, C. & G. S. School, Ft. Leavenworth, August 29.

Captain Douglas E. Morrison, student, C. A. School, Ft. Monroe, to 2d, Ft. Monroe.

Captain Everard F. Olsen, 51st, Ft. Monroe, to student, C. & G. S. School, Ft. Leavenworth, August 29.

Captain Thomas R. Parker, student, C. & G. S. School, Ft. Leavenworth, to 61st, Ft. Sheridan, June 30.

Captain George A. Patrick, 52d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

Captain Paul W. Rutledge, 2d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

Captain William R. Sprague, CA-Res., Washington, to active duty, Office Chief of Coast Artillery, for two weeks, June 1.

Captain Robert J. VanBuskirk, student, C. A. School, Ft. Monroe, to 2d, Ft. Monroe.

Captain William W. Wertz, student, C. A. School, Ft. Monroe, to 69th, Ft. McClellan, June 30.

1st Lt. Laurence W. Bartlett, student, C. A. School, Ft. Monroe, to student, Advanced Technical Course, C. A. School, Ft. Monroe, September 8.

1st Lt. Arthur H. Bender, student, C. A. School, Ft. Monroe, to 69th, Ft. McClellan, June 30.

1st Lt. Herbert T. Benz, student, C. A. School, Ft. Monroe, to 2d, Ft. Monroe.

1st Lt. Robert W. Berry, student, C. A. School, Ft. Monroe, to 51st, Ft. Monroe.

1st Lt. Charles N. Branham, student,

C. A. School, Ft. Monroe, to 6th, Ft. Winfield Scott, sailing New York, June 20. Previous orders revoked.

1st Lt. Nathaniel A. Burnell, 2d, student, C. A. School, Ft. Monroe, to 2d, Ft. Monroe.

1st Lt. John R. Burnett, 2d, Ft. Monroe, to Panama, sailing New York, May 4.

1st Lt. Pio Q. Caluya, student, C. A. School, Ft. Monroe, to the Philippines, sailing New York, June 20.

1st Lt. Elmer E. Count, Jr., student, C. A. School, Ft. Monroe, to 62d, Ft. Totten, June 30.

1st Lt. William V. Davis, 63d, Ft. MacArthur, to student, C. A. School, Ft. Monroe, sailing San Francisco, August 1.

1st Lt. Frederick E. Day, student, University of California, Berkeley, to U. S. Military Academy, West Point, August 1.

1st Lt. Pierre B. Denson, student, C. A. School, Ft. Monroe, to 6th, Ft. Winfield Scott, sailing New York, June 20.

1st Lt. Parmer W. Edwards, student, C. A. School, Ft. Monroe, to student, Advanced Technical Course, C. A. School, Ft. Monroe, September 8.

1st Lt. Hamilton P. Ellis, student, Quartermaster Corps Motor Transport School, Holabird, Baltimore, to 61st, Ft. Sheridan, June 30.

1st Lt. Bonner F. Fellers, 62d, Ft. Totten, to student, C. & G. S. School, Ft. Leavenworth, August 29.

1st Lt. Lester D. Flory, instructor, C. A. School, Ft. Monroe, to 62d, Ft. Totten, June 30.

1st Lt. Forrest J. French, 2d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

1st Lt. Paul W. George, instructor, Massachusetts National Guard, Fall River, to student, Quartermaster School, Philadelphia, August 20.

1st Lt. Richard H. Grinder, student, C. A. School, Ft. Monroe, to 7th, Ft. DuPont, June 30.

1st Lt. Franklin K. Gurley, student, Quartermaster Corps Motor Transport School, Holabird, Baltimore, to 62d, Ft. MacArthur.

1st Lt. Paul L. Harter, 6th, Ft. Winfield Scott, to student, C. & G. S. School, Ft. Leavenworth, August 29.

1st Lt. William B. Hawthorne, student, C. A. School, Ft. Monroe, to 52d, Ft. Monroe.

1st Lt. Raleigh R. Hendrix, 2d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

1st Lt. John S. Henn, student, C. A. School, Ft. Monroe, to 69th, Ft. McClellan, June 30.

1st Lt. Henry L. Hughes, student, C. A. School, Ft. Monroe, to 14th, Ft. Worden, sailing New York, June 20.

1st Lt. John W. Huyssoon, student, C. A. School, Ft. Monroe, to 11th, Ft. H. G. Wright, June 30.

1st Lt. Paul A. Jaceard, student, C. A. School, Ft. Monroe, to 52d, Ft. Monroe.

1st Lt. John J. Johnson, student, C. A. School, Ft. Monroe, to 10th, Ft. Rodman, June 30.

1st Lt. William H. Kendall, student, C. A. School, Ft. Monroe, to 51st, Ft. Monroe.

1st Lt. Edward A. Kleinman, student, C. A. School, Ft. Monroe, to 51st, Ft. Monroe.

1st Lt. Charles W. McGeehan, 62d, Ft. Totten, to student, C. A. School, Ft. Monroe, September 8.

1st Lt. William L. McPherson, 52d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

1st Lt. Harry E. Magnuson, 51st, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

1st Lt. Albert D. Miller, student, C. A. School, Ft. Monroe, to 14th, Ft. Worden, sailing New York, June 20.

1st Lt. Floyd A. Mitchell, student, Mass. Inst. of Tech., Cambridge, to 11th, Ft. H. G. Wright, June 30.

1st Lt. Frank F. Miter, student, C. A. School, Ft. Monroe, to 52d, Ft. Hancock, June 30.

1st Lt. Samuel H. Morrow, student, C. A. School, Ft. Monroe, to 13th, Ft. Barrancas, June 30.

1st Lt. John E. Mortimer, 13th, Ft. Barrancas, to student, C. A. School, Ft. Monroe, September 8.

1st Lt. James W. Mosteller, Jr., student, C. A. School, Ft. Monroe, to 5th, Ft. Hamilton, June 30.

1st Lt. Robert J. Moulton, 5th, Ft. Hamilton, to student, C. A. School, Ft. Monroe, September 8.

1st Lt. Paul B. Nelson, 6th, Ft. Winfield Scott, to student, C. A. School, Ft. Monroe, sailing San Francisco, August 1.

1st Lt. Howard H. Newman, Jr., Panama, orders to 52d, Ft. Monroe, revoked.

1st Lt. William F. Niethamer, 10th, Ft. Rodman, to student, C. A. School, Ft. Monroe, September 8.

1st Lt. George F. Pierce, student, C. A. School, Ft. Monroe, to 6th, Ft. Winfield Scott, sailing New York, June 20.

1st Lt. Ralph W. Russell, student, C. A. School, Ft. Monroe, to 13th, Ft. Barrancas, June 30.

1st Lt. Frederick F. Scheffler, student, C. A. School, Ft. Monroe, to 6th, Ft. Winfield Scott, sailing New York, June 20.

1st Lt. Grayson Schmidt, student, C. A. School, Ft. Monroe, to 2d, Ft. Monroe.

1st Lt. Norman B. Simmonds, student, C. A. School, Ft. Monroe, to 6th, Ft. Winfield Scott, sailing New York, June 20.

1st Lt. Joe F. Simmons, Panama, orders to 13th, Ft. Barrancas, revoked.

1st Lt. Eugene C. Smallwood, 2d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

1st Lt. Donald H. Smith, student, C. A. School, to 6th, Ft. Winfield Scott, sailing New York, June 20.

1st Lt. Leland S. Smith, student, C. A. School, Ft. Monroe, to 61st, Ft. Sheridan, June 30.

1st Lt. Henry E. Strickland, student, C. A. School, Ft. Monroe, to 52d, Ft. Hancock, July 8.

1st Lt. George A. Tucker, student, C. A. School, Ft. Monroe, to 13th, Ft. Barrancas, June 30.

1st Lt. William A. Weddell, student, C. A. School, Ft. Monroe, to 6th, Ft. Winfield Scott, sailing New York, June 20.

1st Lt. Walter L. Weible, 63d, Ft. MacArthur, to student, C. & G. S. School, Ft. Leavenworth, August 29.

1st Lt. Thomas B. White, student, C. A. School, Ft. Monroe, to 14th, Ft. Worden, sailing New York, June 20.

1st Lt. Albert J. Wick, 7th, Ft. DuPont, to student, Quartermaster School, Philadelphia, August 20.

1st Lt. Fred J. Woods, student, C. A. School, Ft. Monroe, to 6th, Ft. Winfield Scott, sailing New York, June 20.

1st Lt. George E. Young, 51st, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

1st Lt. Layton A. Zimmer, 52d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

2d Lt. George R. Carey, 2d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

2d Lt. Robert E. Cron, Jr., transferred to Quartermaster Corps, April 14.

2d Lt. Matthew K. Deichmann, student, C. A. School, Ft. Monroe, to 69th, Ft. McClellan, June 30.

2d Lt. Edward B. Hempstead, 2d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

2d Lt. William H. Hennig, 62d, Ft. Totten, to U. S. Military Academy, West Point, August 21.

2d Lt. John J. Holst, 61st, Ft. Sheridan, to student, C. A. School, Ft. Monroe, September 8.

2d Lt. George E. Keeler, 2d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

2d Lt. John H. Kochevar, student, C. A. School, Ft. Monroe, to 14th, Ft. Worden, sailing New York, June 20. Previous orders revoked.

2d Lt. Frank T. Ostenberg, student, C. A. School, Ft. Monroe, to 52d, Ft. Monroe.

2d Lt. Montgomery B. Raymond, 13th, Ft. Barrancas, to student, C. A. School, Ft. Monroe, September 8.

2d Lt. Arthur Roth, student, University of Michigan, Ann Arbor to 62d, Ft. Totten, June 30.

2d Lt. Walter A. Rude, from Air Corps, Randolph Field, to 6th, Ft. Winfield Scott.

2d Lt. John A. Sawyer, 11th, Ft. H. G. Wright, to student, C. A. School, Ft. Monroe, September 8.

2d Lt. Guy E. Thrans, student, C. A. School, Ft. Monroe, to 2d, Ft. Monroe.

2d Lt. Harry F. Townsend, student, C. A. School, Ft. Monroe, to 14th, Ft. Worden, sailing New York, June 20.

2d Lt. William M. Vestal, 2d, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

2d Lt. Louis T. Vickers, 51st, Ft. Monroe, to student, C. A. School, Ft. Monroe, September 8.

2d Lt. Joy T. Wrean, student, C. A. School, Ft. Monroe, to 61st, Ft. Sheridan, June 30.

Master Sgt. Leon H. David, C. A. School Detachment, Ft. Monroe, retired, April 30.

Master Sgt. Alfred J. Johnson, C. A. School, Ft. Monroe Detachment, retired, April 30.

1st Sgt. Lon J. McKoy, 60th, Ft. Mills, retired, March 31.

1st Sgt. Marcel Surette, 11th, Ft. H. G. Wright, retired, April 30.

Tech. Sgt. Ira O. Miller, 13th, Ft. Barrancas, retired, April 30.

Sgt. David A. Bridges, Office of Chief of Coast Artillery, transferred as private to Headquarters Company, Washington.

Sgt. Fate Stephens, 13th, Ft. Barrancas, retired, April 30.

BOOK REVIEWS

THIRTY-FIVE YEARS: 1874-1909—Henry Spencer Wilkinson. London: Constable & Co., Ltd. 1933. 319 pp. 16/ net.

Here is a rich plum pudding for soldiers, sailors and statesmen; for in the spiced dough of facts there are plums of wisdom. This is the kind of book that one keeps, and re-reads and meditates upon. It tells of a lifetime devoted to the study of war. It has illuminating sidelights on how things may be done. There are reminiscences and evaluations of such soldiers, sailors and statesmen as von Moltke, Lord Roberts, Kitchener, Lord Beresford, Lord Rosebery, and Lord Grey. There are peeps behind the scenes.

Spenser Wilkinson will be remembered best in this country by his masterly description of the Prussian General Staff in a small book called *The Brain of an Army*—a book which played its part in the formation of our own General Staff, as you shall see. Others may recall his solid work on *War and Policy* or his recent works on the origins and development of Napoleon's generalship. These are, perhaps, the outward and visible signs of Professor Wilkinson's life work, which includes reforms in the British militia system, in the Regular Army, the Admiralty, the Ordnance Survey and in Imperial Defense.

As has been suggested, his influence extended incidentally to the United States. Following is his account of how his book, *The Brain of an Army*, came to play a part in the foundation of our own General Staff:

"An American friend, who was a keen officer in the militia of his own State, came one day to tell me that General Ludlow was in London, having been sent by President McKinley to report on the Prussian General Staff, and to propose that I should go with him to call on Ludlow, whose acquaintance I had made some years before, when he had been military attache in London. I took with me a copy of my book on the Prussian General Staff, and suggested to Ludlow that it might be of use to him as an introduction to the institution which he was to study * * * Ludlow was evidently reluctant to believe that a civilian could possibly know anything about the subject, and I felt that it was only out of politeness that he accepted the book. I heard no more of him for many weeks, but at last received a telegram begging me to go and see him at once as he was to sail next day for New York.

His tone was now quite changed. He talked to me as a man talks to his professional colleague. He said, "Would you like to have your book? I have made some notes in it." So I asked him to let me see the notes. In about a dozen places he had written in the margin "Is this correct?" and in every case his Prussian mentor had written under his query the word "Yes"—so I suggested that he should keep the book.

The scene shifts to 1903:

When Mr. Root, who had been McKinley's Secretary of State for War, was in London, Oliver Borthwick came to my room and said, "Root wants to make your acquaintance, so you are to dine with me tomorrow at the Savoy * * *. Root went on to say that Ludlow had given him my book, which he had carefully studied, and then he told me how he had reformed the American army. I had followed his reforms, but had not divined his governing idea, which he now explained. He said: "I created a general staff, but not quite on the Prussian system. I began by abolishing the Commander-in-Chief. By our constitution the head of the army is the President. He acts through the Secretary of State,¹ who is practically supreme over the army. But while we had a Commander-in-Chief that officer always imagined he was the head of the army. I thought it was a bad plan to have two men riding the same horse. I thought it would be better for one of them to get down, and as I couldn't abolish the President or the Secretary I abolished the Commander-in-Chief and appointed an officer to be called 'Chief of the General Staff,' who, under me, was to have complete control, and I let him organize his general staff."

Elihu Root was to Spenser Wilkinson "the ablest American I ever met"; and a life-long friendship sprang up between the two men, although they never met again and seldom corresponded. The following extracts are quoted from one of the rare letters from Root:

"October 15, 1919.

"* * * Plainly, it would have been impossible both for England and for America to play the roles they have in saving us all from German domination but for the existence of General Staffs whose business it was to think and plan and secure information.

"I do not forget, although I daresay a great many people do, what a great part your little book "The Brain of the Army" played in bringing it to press that both countries had some sort of institution of that kind already in existence when the sudden emergency came."

Spenser Wilkinson came of an English family in which the tradition of public service was strong. In his preface he says: "My active life has been the outcome of a single idea." That this idea took the form of a solid research into the facts of war and led to military and naval reforms was a happy circumstance for his country; for his studies had a far-reaching effect. Through the deserts of disappointment, disillusion and poverty he followed his cloud of smoke

¹ Sic! Obviously the Secretary of War is meant. The English equivalent is the Secretary of State for War. Apparently the words for War have been inadvertently omitted.

by day and pillar of fire by night; finding, however, by the way, rich and enduring friendships. Today, as a Fellow of All Souls' College, Oxford, he takes his reward in the consciousness of having fought the good fight, finished the course and having kept the faith. That, and the translating of Homer, fill his twilight days with contentment.

To Americans the reading of his reminiscences will suggest the idea that in the civilian components of our army today—the National Guard, the Officers' Reserve Corps and the R.O.T.C., we have a fertile recruiting ground for potential Spenser Wilkinsons: Men who may be led to make a thorough and systematic study of war and policy and, in the future, guide public opinion as regards their interrelation; either in public office or through the press. Democracies especially have need of public servants and publicists who have a solid understanding of such matters; and in the United States, since the death of Admiral Mahan, we have had no outstanding student of war. Professors of Military Science and Tactics in our universities will do well to read this latest work of Professor Wilkinson (together with his address on *The University and the Study of War*)¹ and to recommend it to their students.

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THE FUTURE OF INFANTRY—By Captain B. H. Liddell Hart. London: Faber and Faber, Ltd. 1933. 2/6 net.

"The King is dead. Long live the King!" This is the theme of Captain Liddell Hart's latest book.

The first of a series of little manuals on military subjects. (The next to appear will be General J. F. C. Fuller's *Generalship, its Diseases and their Cure*.)

The footsoldier has as brilliant a future as he has had a brilliant past, provided that he lives up to the rule that "The nature of armies is determined by the nature of the civilization in which they exist"; which is to say that the army first to come into harmony with the requirements of its time will have an enormous advantage.

To determine what the future of infantry will be, the author gives us a compact summary of its past development, both alone and in conjunction with other arms; and, as a graph may be used to project a curve and reveal probable future tendencies, he applies the lessons of the past to the present and to the immediate future.

The result is to stress the need for periodic rejuvenations to renew mobility and flexibility. In the past this process has often been achieved among foot troops through the gradual development of "light infantry," just as armies have become more mobile through new cavalry developments. Thus the invincible Spartan hoplites on the rough ground of the island of Sphacteria surrendered to light-armed pel-tasts; and a new era came when Iphikrates cut up a

Spartan phalanx near Corinth.² Under Alexander the Great the infantry phalanx still played its role in battle; but as part of a team of combined arms including light infantry, cavalry and artillery. Saxe and Frederick were forced to adopt light infantry to restore the mobility of the foot troops. The Virginia militia which covered the retreat of Braddock's rigid regiments was in reality light infantry. In the American Revolution, Washington organized light divisions under Lafayette and de Lauzun. The American Civil War was fought largely by light infantry—what else was Jackson's "foot cavalry"? During the Napoleonic Wars the light infantry developed by Sir John Moore won itself fame in the Peninsular War as Craufurd's Light Division. In the war in South Africa the Boers employed what was in reality light infantry; and to such effect that their resistance was overcome only by the creation of mounted infantry.

The history of the combined arms is similar: Parthian, Gothic, Saracen and Mongol cavalry forced modifications in existing armies; and when in Western Europe cavalry became immobile, it fell before the new infantry, whether archers or halberdiers. The combined arms must be able to work in concert, and to that end flexibility is needed. Epaminondas and Alexander devised more flexible organizations. The Macedonian phalanx gave way before the flexible maniples of the Roman legion. It in turn was helpless before the maneuverable wings of Hannibal's army which in turn yielded before the still more flexible instrument of Scipio Africanus. There must be no discordance between the combined arms, such as existed in the armies of Justinian: Belisarius defeated the Vandals with his cavalry alone; in the words of Procopius, "The next day the infantry, with the wife of Belisarius, came up; and we all proceeded to Carthage."

In order to escape such a discordance as this, Captain Liddell Hart would form two distinct types of infantry: the line infantry, strong in fire power, to hold organized defenses, guard communications, etc., and a light, highly mobile infantry capable of swift, skilled offensive action. The latter in turn would be of two types or, at least, be used in two different ways. During the World War stalemate, owing to the power of the machine-gun, "There were two possible ways of revising movement on the battle-field. One was to make men bullet-proof by putting them in armoured vehicles. The other was to teach men to evade bullets by a revival of stalking methods. The British were pioneers of the first, the Germans of the second method"—infiltration.

This theory of infantry has its attractions for Americans, in that it fits into our scheme of national defense, our present economic and social organization, and is in keeping with our historical traditions. It would be possible to train our Regular and National Guard troops to fight as aggressive light infantry, and to allot the defensive role to newly organized formations while they were perfecting their training. This de-

¹Inaugural address to the University of Oxford on assuming the chair of the Chichele Professorship of Military History. Oxford. At the Clarendon Press. 1909.

²See Spaulding, Nickerson and Wright. *Warfare*. New York. 1925. pp. 71-74.

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fensive type of infantry can be trained rapidly in its relatively simple functions and would have a value out of proportion to its training because "For defense and protective duties common infantry have more value than ever in the past, by reason of modern firearms."

Owing to the extent of the use of motor vehicles in this country and the facilities for producing them,—to say nothing of the ready-made tactics of our "racketeers"—we could produce tank and armored car infantry faster than any other nation; and as for the light infantry fighting on foot, skirmishing ("stalking" as Captain Liddell Hart calls it) or bushwacking tactics form part of our military tradition and are congenial to our people. That is the way in which American soldiers tackled the problem of machine gun nests; a method of which Liddell Hart says, "I believe that machine-gun stalking—in suitable country—offers possibilities that few soldiers have yet realized."

But "We cannot expect mobility on the battle-field unless the man who fights on foot is given a chance to be mobile. He must be clothed and equipped as an athlete, not as a pack animal." The author points out that, whereas medical research indicates that 30 pounds is the ideal maximum, during the World War foot soldiers were often required to carry a pack equal to two-thirds their own weight, whereas mules were required to carry a load equivalent to only one-third of their weight. In our army we are acutely aware of this problem and have been doing everything in our power to reduce the weight of the soldier's pack—except to organize along fresh lines. We cannot escape the consequences as long as we retain our present form of organization.

The problem is "To get thar fustest with the mostest"; and to that end we must not be dominated by our organization and supply; but we should make our organization and supply conform to our need for freedom of movement: mobility and flexibility. It is to this end that the author suggests the differentiation of infantry along functional lines, making heavy infantry the core of battle and light infantry the mobile, aggressive element, whether in motor vehicles or on foot.

To secure this mobility he would sacrifice even the bayonet. A less radical solution would be to seek a new type of bayonet made from light, tough alloys. The uniform would be designed to give freedom of movement as well as protection: the Anzac type of head gear and coat, the knickerbocker type of breeches to free the knees. He would discard the sox which shrink or wrinkle, and substitute the linen wrapping such as is used in the French Foreign Legion. A rainproof cloak would serve the double role of overcoat and blanket, thereby greatly reducing the weight carried.

While the particular battalion organization suggested in Appendix I might not meet American needs or tastes, like the rest of the book, it is highly provocative and suggestive of thought.